

THE IRON AGE

A Review of the Hardware, Iron, Machinery, &c., Trades.

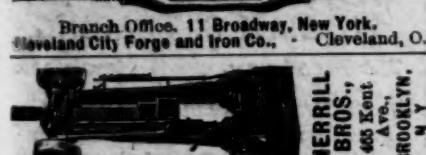
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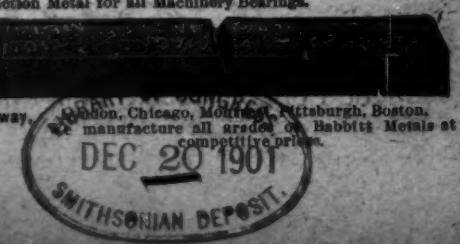


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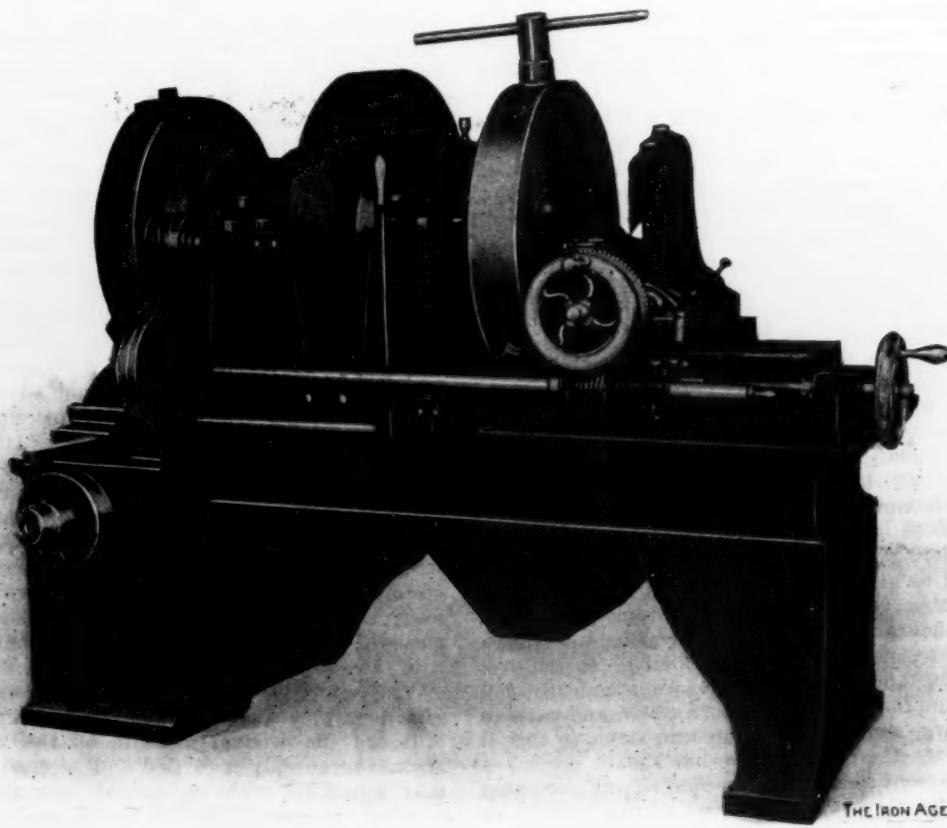
THE IRON AGE

THURSDAY, DECEMBER 19, 1901.

The Hurlbut-Rogers Cutting Off Machine.

The cutting off machine just brought out by the Hurlbut-Rogers Machine Company of South Sudbury, Mass., will cut off unfinished stock up to 8 inches in diameter. As the tools approach the center the speed is accelerated, thereby insuring a practically uniform peripheral speed of the stock as the cutters approach its center. It is evident that this method increases the capacity of the machine over what it would be if the speed remained constant. The cutting tools are made of special steel, and are ground straight and true after having been tempered. The chucks are 24 inches in diameter and of extra heavy pattern. The carriage is movable about 7 inches parallel with the spindle and car-

The time detector consists of a watch movement enclosed in a tin case, about $3\frac{1}{2}$ inches in diameter and about 2 inches in depth. The keys are ordinary keys with different numbers on their bits, and a set of keys is furnished with each clock. Their purpose is not to wind the mechanism, that function being performed by an ordinary winding arrangement located in the back of the case, but they are to be carried by watchmen or others whose rounds are to be recorded, and are inserted in a keyhole in the metal case. Attached to the watch movement is a paper revolvable dial, and when a key is inserted and turned it marks its number on the dial, and also operates a pointed finger which punches a hole in the paper dial, thus registering the time when the key was inserted. The instrument is designed to be used in



THE HURLBUT-ROGERS CUTTING OFF MACHINE.

ries the length gauge. The countershaft has two speeds, so that in cutting hard stock a slow speed can be used, and in cutting soft stock a faster speed. The machine is so constructed that an electric motor can be readily applied for driving it.

The Duty on Time Detectors.

In the matter of the protest by the United States Express Company against the decision of the Collector of Customs of Chicago the following decision has been rendered by the Board of General Appraisers:

The articles here subject of protest are so-called time detectors and keys to be used in connection therewith, returned by the local appraiser as manufactures of metal and assessed for duty at the rate of 45 per cent. ad valorem under paragraph 193 of the act of July 24, 1897. They are claimed to be dutiable as "clocks and parts thereof," under paragraph 191 of said act.

warehouses to register the time that a watchman makes his rounds, and when set up ready for use the entire mechanism is hidden from view, a tin cover being so constructed as to set over and lock upon the case.

While the article can be used as a timepiece by removing the cover, it is not, in the ordinary sense, a clock or a watch, and is clearly not one of the class of articles covered by the provision in paragraph 191. It is true it contains a watch movement, but it is something more than a watch movement; it is a combination of a watch movement and of other devices not a part of a watch.

We find that the so-called time detectors are not clocks or clock movements, nor watches or watch movements, and we hold that they were correctly assessed for duty as manufactures of metal not specially provided for. It follows, as a matter of course, that the keys in question are not parts of clocks, and that they were also correctly assessed for duty as manufactures of metal.

The protests are overruled and the decisions of the collector affirmed.

The Ship Subsidy Bill.

WASHINGTON, D. C., December 17, 1901.—Senator Frye, Chairman of the Senate Committee on Commerce, has appointed a sub-committee for the consideration of the new shipping bill, consisting of himself, Senators Elkins, Hanna and Depew, Republicans, and Jones of Nevada, Turner and Martin, Democrats. As the committee will hold but one meeting prior to the holiday recess the shipping bill will not be taken up until Congress reconvenes, but on Thursday, January 9, the measure will be formally laid before the sub-committee.

It is the present expectation that the consideration of the bill in sub-committee will be very brief, and that the measure will be promptly reported to the full committee, where its detailed discussion will take place. The committee has been authorized to hold hearings on the measure, if such a course seems desirable, and authority has been granted for the employment of stenographers with a view to printing the testimony taken for the enlightenment of both the Senate and the House. The make-up of the sub-committee is decidedly favorable to a prompt report, as Senators Frye, Hanna, Elkins and Depew are all enthusiastic advocates of a shipping bill, and it is anticipated that the consideration of the subject by the full committee will be under way before January 15.

The situation with regard to the new bill is distinctly different in a number of important particulars from that which confronted the shipping bill presented by Senator Frye in the last Congress. In some respects the new measure will be much stronger than the old, but in other particulars it is less satisfactory to important interests and will therefore receive their support to a limited extent, if at all. Senator Frye frankly states that the new bill has been so modified with a view to obviating the objections raised against the original measure that it is likely to prove less effective in carrying out the broad purpose of the advocates of the measure, which is the building up of the American merchant marine in the shortest possible space of time, than the old bill would have been. The original measure provided that whenever an individual or corporation should construct a certain amount of tonnage in American yards it should then be permissible to import an equivalent amount of foreign construction, for which American registers would be granted. In the present bill the admission of foreign vessels to American register is eliminated, and hence this method of increasing the American merchant marine will not be available. In the Senator's opinion American shipyards are practically full up with orders for the next year and a half, and have an unusually large number of contracts in sight, so that it is doubtful whether, if the new bill should become a law at the present session, there would be any important increase in the merchant marine within the next three years in excess of the normal growth under present conditions. He believes, however, that except for the impetus that might be given to the registration of foreign ships the elimination of this provision is desirable, and especially because of the extent to which the modification will strengthen the new bill with the high protection members of both Houses.

A careful canvass is being made of the various interests in Congress likely to be brought into line, either for or against the new bill. One agency which was largely in evidence in support of the original bill a year ago is now conspicuous by its absence. This is the Committee of Fifteen, representing steamship lines, shipyards and other interests, for which Senator Edmunds of Vermont appeared as counsel, and which was largely instrumental in drafting the original measure. Prominent upon this committee were representatives of the so-called American Line of steamships, which line unquestionably would have received large benefits from the passage of the bill, although the extent of such benefits was probably exaggerated by the opponents of the bill. The fact that none of the members of the Committee of Fifteen have appeared in Washington, and that the organization has practically disbanded, is accounted for

by the friends of the new measure on the ground that while it would be of great assistance to the shipbuilding and shipowning interests it would not operate to grant large subsidies to any one line, but would, in its general effect, distribute a smaller aggregate amount of money to a larger number of beneficiaries.

The contingent of Senators representing the States of the Middle West, where the farmer vote is an influential factor, are examining Mr. Frye's new bill with great interest and are comparing it with the old measure with decidedly favorable conclusions. These Senators are gradually coming to the opinion that something must be done to insure shipping facilities for the farmers' crops in case the nations whose vessels we are now dependent upon should become involved in wars, either with each other or with the United States. This consideration, which was overbalanced in the minds of many Senators by the fact of the large aggregate in the way of subsidies carried in the original bill, is developing much importance in view of a better understanding of the situation taken in connection with the important reduction in the premiums provided by the new bill. There is nevertheless an element among the Middle Western Senators which is disposed to make capital of the extent to which Atlantic and Pacific steamship lines are dominated by the transcontinental railroads, and these Senators emphasize the contention that the railroads will always decide what steamships shall carry cargoes, and that the so-called tramp vessel will never be able to do anything but a precarious business, so far as the European or Oriental trade is concerned. These Senators insist that the present situation calls for encouragement to builders and owners to develop our trade with South America, the West Indies, &c., in such a way as to secure for American manufacturers an exporters' market, which logically belongs to the United States.

Half a dozen prominent Senators, representing great lake interests, both shipbuilding and shipowning, are disposed to treat the new bill with some indifference, on the ground that it would be of no advantage to their constituents, but indirectly would discriminate against them through the assistance given to Atlantic and Pacific shipyards and vessel owners. The representative of one of the largest ship owning interests on the lakes has frequently asserted that with one-half the subsidy granted by the old bill he could build vessels, run them with or without cargoes and clear 6 per cent. on the investment. The Senators referred to, however, are strong party men, and should the Frye bill become a caucus measure, as is likely to be the case, they will support it in the end.

The minority Senators find themselves placed in something of a quandary by the new Frye bill. They criticised the original measure on the ground of the amount of subsidy it carried and because of the grants that would be made to special interests. These two features are now eliminated, but so also is the provision for American registers for foreign built vessels, which feature of the original bill was very generally approved by the minority. Senator Vest, who offered a free ship bill as a substitute for the original Frye measure, declares with some emphasis that he would prefer the old bill to the new on account of the elimination of the importation clause, and it is probable that he will again offer his free ship bill as a substitute. It is not likely that the Frye bill will command more than two or three votes on the minority side of the Senate, but the modifications made in the new measure are believed to be sufficiently radical to remove all excuse for an organized filibuster against the bill.

The programme of the advocates of a shipping bill in the House will be arranged soon after the holiday recess. Chairman Grosvenor of the Committee on the Merchant Marine and Fisheries is disposed to favor a more radical measure than that drafted by Senator Frye, but he concedes that the elimination of the ship importation clause and the reduction of premiums will greatly strengthen the bill among such men as Hopkins of Illinois, Minor of Wisconsin, Stevens of Minnesota, Fordney of Michigan, &c., who are members of the committee. In the make-up of the committee for this Con-

gress Speaker Henderson has followed the policy pursued throughout his committee lists of increasing the majority and decreasing the minority representations, so that this committee stands 11 Republicans to six Democrats, as follows: Grosvenor of Ohio (chairman), Hopkins of Illinois, Young of Pennsylvania, Greene of Massachusetts, Minor of Wisconsin, Stevens of Minnesota, Jones of Washington, Fordney of Michigan, Wachter of Maryland, Vreeland of New York, Littlefield of Maine, Republicans; and Spight of Mississippi, Small of North Carolina, Davis of Florida, McDermott of New Jersey, Belmont of New York and Snook of Ohio. Vreeland and Littlefield (Republicans) and Davis, McDermott, Belmont and Snook (Democrats) are the new members of the committee. Immediately after the holidays a meeting will be held to determine whether the committee will await the action of the Senate on the Frye bill before undertaking to report a measure, and the discussion at this meeting is relied upon to demonstrate whether the Frye bill will be sufficiently acceptable to the majority to make it unnecessary to draft a special measure.

W. L. C.

The Atlas Boiler Tube Cleaner.

The Atlas boiler tube cleaner consists of a motor designed to run either by water or steam and which operates a cutter for removing the scale. The motor is a miniature water wheel, D, of the turbine type. Connected with this is the shaft F, formed at one end with the toggle joint H, which unites with the cutter shaft

proved, to permit the exclusive use of Indian coal for industrial purposes. The quantity of Indian coal used in India is therefore supplemented by an importation which has averaged 333,000 tons annually in the last five years. Imported coal is mostly landed in Bombay, the mills there requiring large quantities of fuel, and being too remote from the Indian source of supply to find the Indian coal economical; and in view of the easy conditions on which steamers carry coal to India as freight foreign coal is used. Most of the imported coal is English, a small quantity being received from Japan.

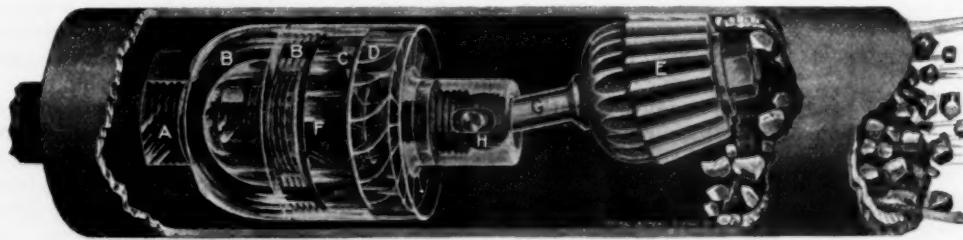
Iron.

The production of iron is as yet quite in its infancy, the ore being worked for the most part only in the Ranigunj district of Bengal, where it occurs in close proximity to the coal fields.

According to the figures—which, however, are of doubtful accuracy—the production in 1900 amounted to 63,000 tons, of which 57,000 tons were produced in Ranigunj. For the adequate utilization of the iron ores in Bengal and other parts of India the application of very large capital is necessary for the manufacture of wrought iron and steel in the forms in which these metals are mainly used in India, and the prospects of such an enterprise do not seem sufficiently decided to induce capitalists at present to venture on the sinking of the great sums required for work on the scale which alone would be remunerative.

Petroleum.

The production, which is confined to Burma and Assam, amounted to 38,000,000 gallons in 1900, about 37,000,000 gallons being of Burman production. Although the production has expanded very largely, it is still insufficient for the requirements of the Indian market, which are met by the importation of some 72,000,000



THE ATLAS BOILER TUBE CLEANER.

G. The water enters at A into the chamber B, from which it passes through the ports C to the turbine blades. The cutter is thus made to revolve at a high rate of speed and its impact against the tube dislodges the scale, which is washed out through the tube by the water. This tube cleaner, made by the Atlas Pipe Wrench Company, 121 Liberty street, New York, is designed to work at any pressure from 60 to 150 pounds. Boilers with scale $\frac{1}{4}$ inch thick on the back end of 18-foot tubes have been cleaned at the rate of five minutes for each tube.

Minerals of British India.

United States Consul-General R. F. Patterson of Calcutta has sent to the State Department a summary of a statement recently issued by the Director-General of Statistics of the British East Indian Government regarding the mineral production of India, from which are taken the following extracts:

Coal.

This industry is expanding so rapidly from year to year that a statement of the average production over a series of years would not convey a true idea of the conditions. The output has increased from 3,540,000 tons in 1895 to 6,118,000 tons in 1900. Coal of varying quality is found over a very extensive area of the Indian region. At present the principal mines are located in the Ranigunj district, in Bengal; at Singarini, in the Nizam's territory; in the Lakimpur district, in Upper Assam; at Mohpani and Warora, in the central provinces, and at Umaria, in the central Indian agency. Indian coal is now extensively—in some places exclusively—employed for the railways, coasting and river steamers, and mills and factories; but, as in the case of salt, the conditions of transport are not sufficiently developed, though they are being greatly im-

proved, to permit the exclusive use of Indian coal for industrial purposes. The quantity of Indian coal used in India is therefore supplemented by an importation which has averaged 333,000 tons annually in the last five years. Imported coal is mostly landed in Bombay, the mills there requiring large quantities of fuel, and being too remote from the Indian source of supply to find the Indian coal economical; and in view of the easy conditions on which steamers carry coal to India as freight foreign coal is used. Most of the imported coal is English, a small quantity being received from Japan.

Other Minerals.

These are relatively of small economic importance. Among other descriptions of minerals manganese ore, mica and tin ore are alone of commercial importance. The production of manganese commenced a few years ago, the product being shipped to England. The extraction of mica has been an industry in Bengal for a considerable period, and recently this mineral has been produced in Madras in some quantity. The mining has been carried on for many years by the Chinese in Lower Burma, but their operations have not indicated any tendency to expand.

The New Andover Furnace.—Joseph Wharton of Philadelphia has decided to rebuild the Andover Furnace, at Phillipsburg, N. J., increasing the height of the furnace stack 10 feet, making it 85 feet, with bosh 17 feet and hearth 10 feet in diameter. An additional fire brick stove will be built and the boiler capacity increased. The pneumatic hoist will be replaced with a steam hoist. The work will commence at once, and be under the charge of Superintendent S. B. Patterson.

Press dispatches from Guernsey, Wyo., state that G. P. Catlin of Hartville has bonded a number of his iron ore mines in the Sunrise district to the Colorado Fuel & Iron Company, the leases to run 20 years. Mr. Catlin is to receive \$1500 per year royalty and a further royalty whenever ore is shipped from the properties. The Colorado Fuel & Iron Company are gaining control of claims in that section, embracing hundreds of acres of iron ore deposits, which run high in metallic iron.

The National Bureau of Standards.

WASHINGTON, D. C., December 10, 1901.—The plans for the first buildings for the use of the National Bureau of Standards authorized by the last Congress have been completed by the Supervising Architect and ground will be broken in a few weeks on the 8-acre site which has just been purchased by the Government in the suburbs of Washington on the line of Connecticut avenue and distant about 3 miles from the Capitol. The physical and mechanical laboratories will be constructed with the appropriation made by the last Congress, and other buildings will be added from time to time as the requirements of the bureau increase and as its usefulness comes to be recognized by manufacturers in various lines of trade. During the past summer the plans of the bureau involving the scope of its work, and especially its functions with reference to standardizing and calibrating the output of private establishments, have been carefully worked out and are described in detail in a report which the Secretary of the Treasury has just submitted to Congress, in part as follows:

The functions of the National Bureau of Standards are as follows:

1. Custody of the standard.
2. Comparison of the standards used in scientific investigations, engineering, manufacturing, commerce and educational institutions with the standards adopted or recognized by the Government.
3. The construction when necessary of standards, their multiples and subdivisions.
4. The testing and calibration of standard measuring apparatus.
5. The solution of problems which arise in connection with standards.
6. The determination of physical constants and the properties of materials when such data are of great importance and not to be obtained of sufficient accuracy elsewhere.

The bureau will exercise its functions for the Government of the United States, for any State or municipal government within the United States, or for any scientific society, educational institution, firm, corporation or individual within the United States requiring the use of standards or standard measuring apparatus. For all comparisons, calibrations, tests, or investigations, except those performed for the Government of the United States or State governments within the United States, a reasonable fee will be charged. Provision has been made for the purchase of a site, the erection of a suitable laboratory, its equipment with the most improved facilities and the personnel necessary for the organization of the bureau.

Although the bill authorizing the bureau did not become fully operative until July 1, 1901, preliminary plans were immediately prepared by the Office of Standard Weights and Measures for carrying out the provisions of the act.

The site selected for the buildings consists of nearly 8 acres in the northwest section of the District of Columbia, near Connecticut avenue and the 3-mile circle. It has an elevation of 350 feet and is one of the most desirable building sites in the District of Columbia. The physical laboratory will be equipped with apparatus and conveniences for carrying on investigations and for testing standards and measuring instruments of all kinds. A somewhat smaller building, to be known as a mechanical laboratory, will contain the power and general electrical machinery and the instrument shop, refrigerating plant, storage batteries, dynamos for experimental purposes and laboratories for electrical measurements requiring heavy currents.

The construction of the buildings will be pushed as rapidly as possible, and it is expected that the smaller building will be ready for occupancy by July 1, 1902, and the larger building by January 1, 1903. In the meantime additional quarters have been secured in the building occupied by the former office of Standard Weights and Measures, with a view to the organization of the bureau and the immediate development of the more needed extensions of the work heretofore carried on, such as

photometric measurements, the testing of instruments for determining high or low temperature, clinical thermometers, chemical glass measuring apparatus, electrical apparatus used to measure alternating currents, pressure gauges and meteorological instruments.

W. L. C.

The Scottish Shipbuilding Industry.

GLASGOW, November 28, 1901.—Coming events cast their shadows before, and the approach of depression in the shipbuilding industry is heralded by an announcement of the Port Glasgow shipbuilders that henceforward until further notice the hours of labor in the yards will be 49 instead of 54 per week. Yet notwithstanding the signs of the times the iron molders of the district have put in a claim for an advance of a farthing an hour in time wages—the amount by which their wages were reduced some months ago. The employers say that they cannot afford this advance just now, but that if there is any improvement in trade three months hence they will give the advance then. The men say they want a promise of the advance three months hence, even if trade is no better than it is at present. There the matter rests. In the meantime if a ballot of the men, now being taken, is in favor of insistence on their demand, there will be trouble.

Our pig iron warrant market keeps steady, but that is not wonderful, as the transactions are so far few and infrequent. As there is now two and a half times as much Cleveland as Scotch iron in the public stores what speculation there is is confined to Cleveland warrants. These have been freely sold down to about 43 shillings, which is about 13 shillings per ton under Scotch, and a most unusual and unnatural difference.

If it be true, as is stated, that Clevelands have been heavily oversold, then the difference may be restored to normal proportions when coming operations begin. In the natural order of things Scotch ought to follow Cleveland down, but Scotch warrants are very scarce, there are only 57,000 tons in the warrant stores, and makers are so busy supplying consumers direct that they cannot make for the stores. Moreover, makers' prices are sustained by the continued deadness of coal and oil. The output in Scotland is now pretty much the same as last year, with 82 furnaces in blast. Our shipments up to this point are about 60,000 tons less, and our imports of Cleveland iron about 155,000 tons more, than in the corresponding portion of last year.

The report of Commissioner Chamberlain on the growth of American shipping and shipbuilding has, of course, been read with much interest in this "hub" of the shipbuilding world. It is noted with concern that, within the knowledge of the commonwealth 89 merchant vessels of an aggregate of 355,645 tons are at present in course of construction in the United States. The concern is not as to Britain's supremacy as shipbuilder and ship-owner, but as to where all this new tonnage is going to find employment, in addition to the enormous tonnage that our shipyards are turning out, not to speak of the smaller but yet appreciable output in Germany. The freight markets are getting worse and worse, and while there are few charters that can be leaving any profit just now there are very many that are leaving actual losers. Week after week steamers are being laid up at our principal ports rather than continue running at a loss, and week after week more new vessels are being put into the water. So great is the depression in freights and so bad is the outlook that second-hand steamers, even if first class and only a year or two old, will not now fetch more than one-half or two-thirds of what would have been eagerly paid for them a year ago. There is certainly not much encouragement at present for America to go in extensively for shipbuilding, and especially if Mr. Chamberlain is right in his estimate of the comparative costs of construction. Mr. Chamberlain's figures, however, are not indorsed by our shipbuilders. The prospect for shipowners is not made brighter by the Shipping Bounties bill now before the French Chambers.

Meanwhile the latest contribution of the British shipyards to the mercantile marine of America, if not to

the American register, is the twin screw steamer "Merion," which was yesterday launched on the Clyde, from the shipyard of John Brown & Co., Limited, who six months ago launched her sister ship, "Haverford." The "Merion" is for the International Navigation Company of Philadelphia, and is of what is called the "intermediate" class, which is to say she combines very large carrying capacity with good (though not high) speed, and with comfortable accommodations for a considerable number of passengers, though not for so many as an "express liner." The "Merion" measures 530 feet in length between perpendiculars, 59 feet in breadth and 39 feet in depth, molded to upper deck. Her measurement is 11,500 gross tons, she is especially strengthened for the North Atlantic weather, and she is constructed to Lloyd's highest classification. The interior is divided by ten watertight bulkheads in such a manner that the vessel will float with even two of the compartments flooded. The bunkers, which are exceptionally large, are so placed as to afford protection to the boilers, this arrangement being with a view to the possible future use of the vessel in transport service. The feature of the ship is the immense cargo space, the holds occupying the whole interior below the upper deck, save where the engines and bunkers are placed. In the cargo space are included large insulated and refrigerating chambers. In two of the holds extending to the lower deck are deep ballast tanks, in addition to the ballast storage capacity of the double cellular bottom. Thus about 4000 tons of water ballast will insure stability and safety to the vessel whenever she has to go to sea in light trim. On the upper deck a long bridge amidships contains accommodation for 500 third class passengers. Above the shelter deck is a bridge house containing large and airy staterooms for 150 first class passengers, with dining saloon, &c. The promenade is overhead, and on this is placed the ladies' sitting room as well as the officers' cabins. The "Merion" is to join the "Haverford" in the Southampton service.

Some one in London has put in circulation a wonderful story of a projected great combine of all the Clyde shipyards under an American syndicate. Strange that the persons chiefly concerned know nothing about the movement. You may believe in a Scotto-American shipbuilding trust when you see it, not before.

Lord Brassey, as president of the London Chamber of Commerce, has been giving shipowners and ship-builders something to think about. He contends that the navy needs large numbers of cruisers as scouts and "intelligence" vessels, and he suggests that these should be provided on the system of co-operation between the Admiralty and private shipowners, so that expenditure on construction for the navy could be concentrated on fighting ships. The idea is not a new one, of course, but Lord Brassey revives and elaborates it at an opportune time. An effective fight even with a war ship may be maintained by a merchant steamer, it is contended, if she is suitably planned as to the ~~protection~~ of her machinery and armament. Such protective measures, however, will reduce the carrying capacity of a merchant steamer. Professor Biles has calculated that the depreciation in the carrying capacity of an ocean liner designed for conversion into a first-class cruiser may be measured at 10,000 pounds per annum, without the cost of the guns and protecting shields. Lord Brassey advocates the granting of equivalent subsidies by the Admiralty to have the command of the services of such a fleet of swift merchant cruisers, rather than expenditure on the construction of special cruisers for the navy. This is different from a bounty; it would be a subsidy for services rendered by the shipowner in designing his ship for naval uses at a commercial loss to himself. For extra speed it may be desirable to offer an extra subsidy. The Institute of Naval Architecture at their recent meeting in Glasgow passed a resolution in favor of the appointment of a committee of Admiralty officials, shipbuilders and shipowners to discuss the best methods of constructing a combined naval and mercantile marine. Among shipbuilders generally the idea is not favored that merchant steamers can be made convertible into effective fighting ships, but that they can be usefully and largely

employed as scouts and auxiliaries is universally admitted. We shall probably see some developments in this connection in the near future.

B. T.

Central Pennsylvania News.

HARRISBURG, PA., December 17, 1901.—The old stacks and cast houses of the Shawnee furnaces at Columbia are being torn down to make room for the new mills to be built there.

November broke all records at the works of the Bethlehem Steel Company, and the output of all departments was away above the average. The rolling mills and the puddle mill, which was started last week, made large products.

The puddle mill of the E. & G. Brooke Iron Company, at Birdsboro, was slightly damaged by fire on Monday of last week. The roof was burned and for a time the mill was imperiled.

The Carlisle Chain Works, one of the plants of the Standard Chain Company, is to be removed to Lemoyne, near this city. It will double the capacity of the Lemoyne Works, which has 40 fires.

The annual election of the Central Iron & Steel Company was held at Harrisburg on Monday of last week and these officers were elected: President, Edward Bailey; vice-president, James M. Cameron; treasurer and general manager, James B. Bailey, and secretary, S. Bethel Boude. J. Frederic Kernochan and William A. Wallace of New York were chosen as directors. The report of the work of the year showed a large product and considerable business ahead. The company have men working on plans for an open hearth steel plant.

All of the rolling mills at Tyrone and Altoona are in operation. It is also reported that the Berwind-White Coal Company have bought 125 acres of land near Altoona for the building of a car works, at which they will construct their own coal cars. This step is said to have become necessary because of the scarcity of cars and the inability to get coal to the seaboard as quickly as the company's officials would like.

Aurora Furnace of the Susquehanna Iron & Steel Company was banked on Saturday because of inability to get coke. It may be started early next week.

The American Iron & Steel Mfg. Company have decided to build their own cooper shop at Lebanon for the manufacture of their barrels and kegs. These are needed for their bolts and nuts, and the plant will be an extensive one when the plans have been carried out.

It is reported in this city that a company is being formed for the operation of the old iron works at Glen Iron, Union County. This place is the site of one of the oldest iron works in that section of the State, and for years a charcoal furnace was operated there. The old stack is still standing and is said to be in condition for making charcoal iron with some slight improvements.

The Wetherhill Foundry, at Chester, made the largest gray iron casting in its history last Thursday. The casting was for a Corliss engine bed to be built at the Sharon Steel Company's new works, and is one of three gray iron plates, and the weight of each will be over 50,000 pounds. The engine will be one of the best ever built.

The S. Morgan Smith Company of York are preparing plans for an extension of their works.

The Harrisburg Rolling Mill Company, at Harrisburg, have completed and started two more puddling furnaces and others are being built.

The Lehigh Furnace, at Aineyville, has gone into blast after an extended period of idleness.

The Lehigh Valley Railroad officials deny that the company will build a car and engine plant at Chain Dam, near the Chain Dam Furnace of the Thomas Iron Company, or at any other point. Additions are being made, however, to the shops at Easton and other points along the line.

The briefs of the sale of the Lebanon furnaces, Cornwall & Lebanon Railroad and the interests of the Cornwall ore mines to the Pennsylvania Steel Company have been prepared and show some interesting chains of title, some going back as far as Thomas and Richard Penn,

brothers of William Penn, while chains as far back as 100 years are not infrequent. The description gives a large tract near the Lebanon furnaces as a manufacturing site, and on this plot it is believed the company will ultimately build some improvements to the furnaces or some other branch of their works.

An extensive survey at Huff, Indiana County, started the story that a steel works was to be established there. Companies mentioned as likely to make the improvement have denied such intention. S.

Incorporation of Iron Companies in Pennsylvania.

HARRISBURG, PA., December 16, 1901.—There has been a lively demand for charters for companies to manufacture iron and steel and their products at the State Department of the Commonwealth of Pennsylvania lately, and notices have been received that others are to be applied for before the end of the calendar year. In addition to the issuance of charters a number of corporations have filed notices of increases of capital stock.

In the 45 days between November 1 and December 15 there were about 100 corporations chartered at the office of the Secretary of the Commonwealth. Of this number there were 34 corporations chartered to manufacture iron or steel and about 30 water companies, several of which are allied more or less with iron companies. The 34 iron or steel corporations had capital aggregating \$3,600,000. Of this number a majority were for the manufacture of steel in shapes or forms, few being chartered for the production of steel. There were six hardware companies and nine machine companies. The combined capital of the latter companies aggregated over \$1,000,000, while \$175,000 was represented by the hardware companies, three of which will be located in Philadelphia. There were three coal and coke companies incorporated with a combined capital of \$206,000, which was increased later. One fire brick company was added to the long list of such corporations in the Keystone State.

Among the notable corporations chartered were:

Alan Wood Mfg. Company, Conshohocken, capital \$1,250,000.

McClave-Brooks Company, Scranton, capital, \$500,000.

Jessop Steel Company, Washington, capital, \$250,000.

Griffiths Charcoal Iron Mill Company, Washington, capital, \$200,000.

Fischer Foundry & Machine Company, Pittsburgh, capital, \$200,000.

Durham Iron Company, Riegelsville, Bucks County, capital, \$100,000.

New Castle Forge & Bolt Company, New Castle, capital, \$75,000.

Jacobson Mfg. Company, Warren, capital, \$150,000.

Middletown Car Company, Middletown, capital, \$100,000.

Williams Tool Company, Erie, capital, \$60,000.

Niagara Hydraulic Engine Company, Chester, capital, \$50,000.

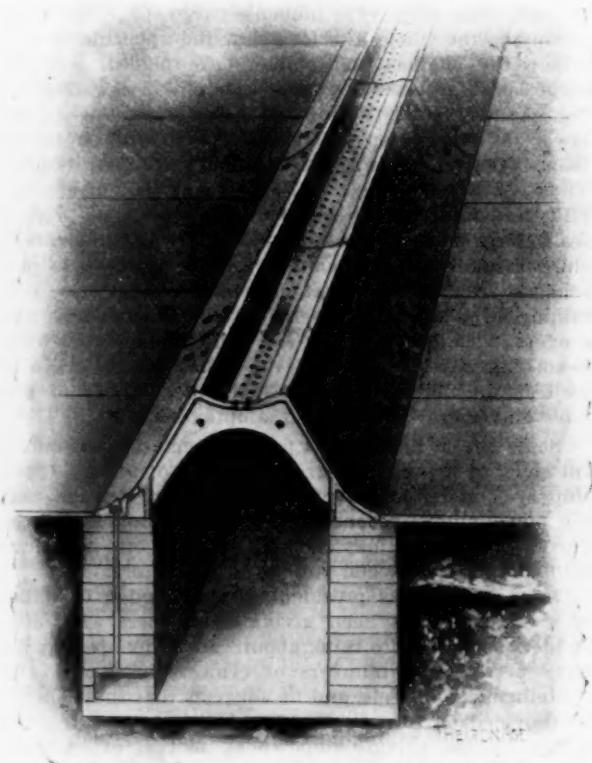
Simpson Stove & Mfg. Company, Pittsburgh, capital, \$50,000. S.

Spokane Galvanized Wire Pipe.—An interesting method of manufacturing wooden water pipe has been developed by the Spokane Galvanized Wire Pipe Company, Spokane, Wash. This pipe is manufactured of kiln dried Oregon fir. The staves are dressed to true mathematical segments, which when assembled form a perfect circle. The pipe is made in standard 8-foot lengths, around which galvanized wire is spirally wound. In winding the wire is paid out under tension adapted to the size of the pipe and wire. The spacing of the wire, as well as its size, is adapted to the pressure under which the pipe is to serve. Thus the higher the pressure the larger the wire used and the closer it is wound. The staves are well dressed, making the inside of the pipe smooth. The wire is double galvanized to insure its longevity. The wood is thoroughly kiln dried to evaporate the sap. The pipe is thoroughly

boiled in asphalt to more completely protect it from destructive agencies. Each joint of the pipe is made with a socket and spigot end, enabling joints to be easily made. It is stated that the only tools necessary in joining the pipe are wooden mauls to drive the joints together. The manufacturers claim that the life of this pipe is from 15 to 20 years. It is further claimed that if the water passing through the pipe should freeze the pipe will not burst as the wire imbeds itself in the wood, the expansion being taken up by the wooden staves. This pipe is finding a large field of operations in sections of the West requiring a cheap pipe for irrigation purposes.

The Vollkommer Pneumatic Hoop and Skelp Conveyor and Run Out.

At the works of the American Steel Hoop Company much trouble was found in handling long lengths and in



THE VOLLMER PNEUMATIC HOOP AND SKELP CONVEYOR AND RUN OUT.

getting the pieces fast enough from the mills. The pulling out by boys limited the length of the pieces, the speed of the mills and thereby the product, and on hot days the boys sometimes refused to work. The roller conveyors, of which a number of different types were tried, while better than pulling out by hand necessitated frequent repairs and stoppages and worked too slow and were unfit for long lengths. These troubles were overcome by the Vollkommer pneumatic conveyors, which were a success from the beginning. A pneumatic conveyor 375 feet long was installed at a cost of less than \$5000, against a roller conveyor system offered for \$25,000. At present the American Steel Hoop Company have eight pneumatics in operation and more under construction. The principle of operation of the conveyor is very simple.

Air from a fan at low pressure is driven into a conduit, or air box, Fig. 1, from where it escapes through the air ports in the running plate or face of the conveyor, forming an air cushion on which the strips float without friction. Theoretically for each $\frac{1}{8}$ inch thickness of plate a pressure of 1 $\frac{1}{2}$ ounces is required; in practice, however, a small excess of pressure is needed, the more the narrower the strips are. It will easily be

understood that they will work still more economically on wider material than on narrow band iron, where the air can easily escape sideways. In most cases the running groove was laid into the level of the mill floor instead of having it raised, as shown in the engraving, and one can walk or drive over it when it is in operation. It also does not obstruct the mill for rolling other shapes, as bars, round, &c., which may be run out in the same groove without air pressure.

Fig. 2 shows a cross section of the fixed running groove, with fixed guides, and Fig. 3 a running groove with loose wedge shaped guides, which may be brought nearer or further apart to accommodate material varying

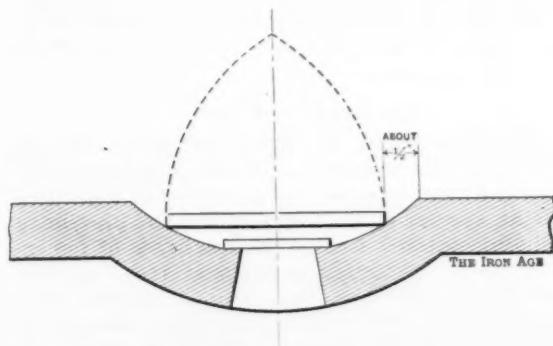


Fig. 2.—Cross Section of Fixed Running Groove.

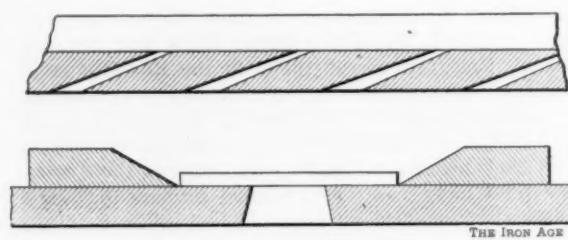


Fig. 3.—Running Groove with Movable Guides.

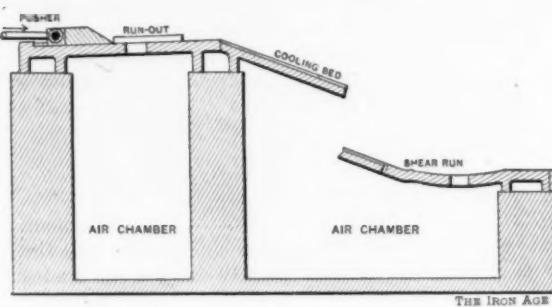


Fig. 4.—Slightly Inclined Running Plate.

THE VOLKOMMER PNEUMATIC HOOP AND SKELP CONVEYOR AND RUN OUT.

much in width. Fig. 4 shows an arrangement with a slightly inclined running plate and only one guide piece, which is also used as pusher to remove the strip sideways to the cooling bed, from where it slides to the shear run, where it is floated again to alleviate the work of the shearsman pulling it to the shears. In this shape the conveyor is particularly adapted for bar and skelp mills and for heavier work generally.

The American Steel Hoop Company have acquired the right for sizes up to 8 inches, while Theo. J. Vollkommer, 503 Lewis Block, Pittsburgh, has still the right for wider sizes.

Mr. Vollkommer has applied the same principle to plate and universal mills for plate conveyors and shear tables.

The imports of merchandise into the United States in the 11 months ended November 30 show an increase

of \$39,972,100 over those for the corresponding period of last year, while the exports show a loss of \$3,562,871. The value of the imports for the months mentioned was \$800,424,607 and of the exports, \$1,328,493,371, and the balance of trade in favor of the United States in that period was \$528,068,764.

Notes from Great Britain.

Tool Steel Tests.

Considerable attention has been given in Germany to some recent investigations with the object of ascertaining the suitability of modern tool steels for high speed cutting tools. Over 800 tests have been made and the Society of German Engineers has now published a report of the inquiry. The inception of this investigation is apparently due to the trials of the Taylor-White tool steel, made by the Bethlehem Steel Company, at the Paris Exhibition. The result of various experiments has been that several German firms have been able to make steel turning tools which show a notable improvement in cutting efficiency and resistance. The points most insisted upon at the inquiry were: 1. What extent of surface can be machined in a given time, with a given depth of cut and any rate of advancement. 2. What weight of cuttings, with maximum depth of cut, could be turned off at a given time. The brands and the names of the firms were as under:

	Hardened by		
No.	Self hardened.	No. pieces.	secret process.
Bergische Stahl Industrie	64	L	
Bohler Brothers.....	16	Titan-Boreas	78 Rapid.
Poldi Works.....	86	Diamond 000	13 Schnelldreher.

These brands are heated to a given temperature and then cooled slowly in the air. As to two of them there is no information either as to composition or method of make, the secret being maintained by the owners. The results are thus tabulated:

	Speed of cutting in inches per second.	Total weight of cuttings per second.	Total surface machined per second.	Cutting edge till blunted.	Dura-tion of
Bergische Stahl Industrie	0.29	0.321	0.0020	309.56	
Bohler Brothers.....	0.29	0.423	0.0027	357.83	
Poldi Works.....	0.29	0.213	0.0013	184.73	

The grooving of chilled rolls, all of equal size and composition, was the work upon which these results were obtained. More will be heard of this document, I have no doubt, in the near future.

The Copper Slump.

There has been a further drop in the price of copper to £55, delivery in three months. Three weeks ago the price was £65 17s. 6d. James Lewis & Son say that the present stock of standard copper only amounts to 11,957 tons. They add that the recent bear selling of 4000 tons by one firm seems a hazardous operation, it being a simple matter under present conditions, and involving very moderate outlay, to bring about a rise in the price of standard much greater than the recent fall. The uncertainty of the copper market is adversely affecting the general metal market, its effect upon Cleveland hematite being particularly depressing. Meantime, whenever the copper market gets lively, either in the bull or bear direction, we hear of new copper fields. Thus attention is once more drawn to the Great Cobbar mine in New South Wales. In the early days when this mine was worked, it being 300 miles from any center, over bush tracks and grassless country, the cost of transit amounted to no less than \$210 per ton. Edward F. Pittman, the New South Wales Government geologist, remarks that the world's increasing demand for copper for industrial purposes bids fair to maintain a good price for the metal, and in view of the increased facilities for carriage which have been, and are still being, effected by the extension of the railways, and in consequence also of the improvements which have been introduced for the treatment of low grade sulphide ores, there is every reason to believe that a new era of prosperity is opening for the copper mining industry in

New South Wales. It is interesting to note that the word "cobar" or "copar" in the aboriginal language means "an earthy iron oxide," and it was from the outcrop of the Cobar lode the natives formerly obtained colored earth for decorative purposes. In January, 1876, the South Cobar Mining Company were amalgamated with the Cobar, under the present title of Great Cobar. Many difficulties, and even losses, were experienced in working the mines, but the dividends paid up to the close of 1898 amounted to over \$1,000,000, being at the rate of \$12.50 per share. Gold is found with the copper. The Nymagee copper mine, in the neighboring district, was purchased in 1896 by the Cobar Mining Syndicate, who introduced a blast furnace for reducing and subsequently started pyritic smelting. The Nymagee copper has always been of good quality; it contains a small proportion of silver, but no gold. The Girilambone copper mine is situated on the western railway line, at a distance of 405 miles from Sydney, and was first opened in the year 1880 by Hartman and Campbell, the discoverers of the Great Cobar mine. The mine was closed down from 1885 to 1893, and also during the years 1895 and 1896. Toward the end of the latter year it was floated into a company named the Girilambone Copper Mining Company, Limited, and mining operations have been carried on ever since. The copper deposits at Mount Hope were discovered in 1878, and, although imperfectly worked by tributaries, 5543 tons of copper, valued at \$1,450,000, have been obtained. The whole country for many miles around is rich in copper lodes, and in several places—Mount Allen, for instance—there is a considerable proportion of gold. A large amount of capital has lately become invested in the State copper mining industry, and with the introduction of improved methods of dealing with the ore a considerable addition to the output is anticipated. In 1900 the New South Wales exports of copper amounted to 133,305 cwt., value \$2,350,000, representing, with 17,067 cwt. of copper ore, value \$35,000, and 12,336 cwt. of copper in matte, value \$130,000, a total of over \$2,500,000.

New Armor Plate Works.

The armor plate mill built by Davy Bros. of Sheffield for Armstrong, Whitworth & Co. and erected at the Openshaw Works had a successful trial on Friday of last week. A steel slab, 15 inches thick and weighing 20 tons, was put in the mill and rolled down to a plate 4 inches thick in nine and one-half minutes. The new plant is said to be unusually powerful and the time occupied in rolling is very much reduced.

German Steel in the Midlands.

Large consignments of steel bars from Germany continue to be received in the black country. They realize an average price of about £4 10s. This is 9 or 10 shillings below the price ruling for local makes, and there is no doubt that the German bars are being sold under cost price. The explanation given is that certain banks in Berlin, having advanced money on the security of stocks, are enforcing realization. The action of the German banks has come in exceedingly convenient to the local sheet steel makers, as previously they had experienced much difficulty in obtaining supplies of English raw material.

Unusual, Let Us Hope.

Sir Richard Tangye of the well-known firm of Tangye Bros. of Birmingham has had what is, I trust, an unusual experience. I tell it in his own words:

"Much has been said of the alleged superiority of German manufactures over those of our own country, but I have never yet heard of English manufacturers placing the names of their German competitors on their goods. But here is an instance in which our Teutonic competitors did not hesitate to resort to this nefarious practice at our expense. One of our foreign agents had sold many of our steam engines to a customer, who also occasionally bought them of another maker. One day we received a vigorous complaint from our agent, in which he stated that one of our engines had broken down irretrievably under a load very much below what we had sold it for. We could not credit the statement,

feeling sure there was a mistake somewhere; accordingly we sent one of our experts to inspect the engine, which he found in a state of perfect wreck. Our name was cast in large letters on the bed plate, 'Tangye, Birmingham,' and he was not surprised at the first glance at its being supposed to be one of our productions. But a little examination soon proved that it was a bad imitation, and on a thorough investigation being made it was discovered that it was a German made engine, but that the person selling it to our agent's customer represented it to be of our make. Of course the price was lower than ours, but the result in that particular market was not encouraging to the unprincipled foreign manufacturer."

Of course the name of Tangye Bros. is one to conjure with and the temptation in this case would be unusually strong. I have, however, heard of one or two other similar instances.

Russian Iron Trust.

A telegram from St. Petersburg announces that all the principal iron founders in Russia have agreed to combine and form a trust, with the object of regulating the output, keeping up the prices of iron and preventing Government contracts from going into hands of foreign contractors. It is further stated that the Ural iron founders, who have hitherto remained isolated, have now joined in. In the present undeveloped state of the Russian iron trade this trust, if a fact, is surely a little premature. At the same time one must remember that Russia is now undertaking a great deal of engineering work, and doubtless strong efforts will be made to have it done as far as possible by Russian engineers and with Russian material. Thus five battle ships and five torpedo boat destroyers are included in the Russian naval programme for the coming year. It is stated that all these boats are to be built in Russia. The large vessels are to be of 12,000 tons displacement and the destroyers will be 230 tons, and therefore very small of their class. Of the total navy vote of 98,000,000 roubles 16,000,000 are to be spent upon new ships. If there is to be much Government iron and steel work of this description no doubt the Russian ironmasters will do their best to push their own interests, and doubtless they have learned their lesson from America and elsewhere. It is just possible that even a trade in its early stages may be developed more quickly on a basis of trade association. If, however, we may judge from the experience of the Austro-Hungarian trust, such a hope is probably ill founded.

Trade Unionism in England.

The *Times* and other papers are just now carrying on a spirited campaign against trade unionism. A special correspondent of that paper, obviously "in the know," is making the best of the case against the trades unionists. I will refer later to this subject and endeavor to sum up the discussion. It is, however, interesting to read that there has recently been a rearrangement of the working agreement in the engineering trade, made at a conference of the Federation of Employers and the Amalgamated Society of Engineers. The main agreement was drawn up at the close of the great strike in 1896. It has worked well, especially the provisions for avoiding and settling disputes, and since it came into operation there have practically been no stoppages in the trade. The alterations made last week are in detail only, the agreement remaining practically as it was. The conference was amicable in every way and has already been accepted by the employers. The ballot of the men has to be taken upon it, but there seems no doubt that the alterations will be accepted with practical unanimity.

S. G. H.

The State Labor Commissioner of Ohio reports the following increases in manufactures in that State for the year: Male employees, monthly average, 12,269; female, 3058; capital invested, \$13,310,377; value of goods, \$35,263,196; materials used, \$16,780,905; wages, \$7,536,851; goods on hand, \$3,068,823; materials on hand, \$3,278,361.

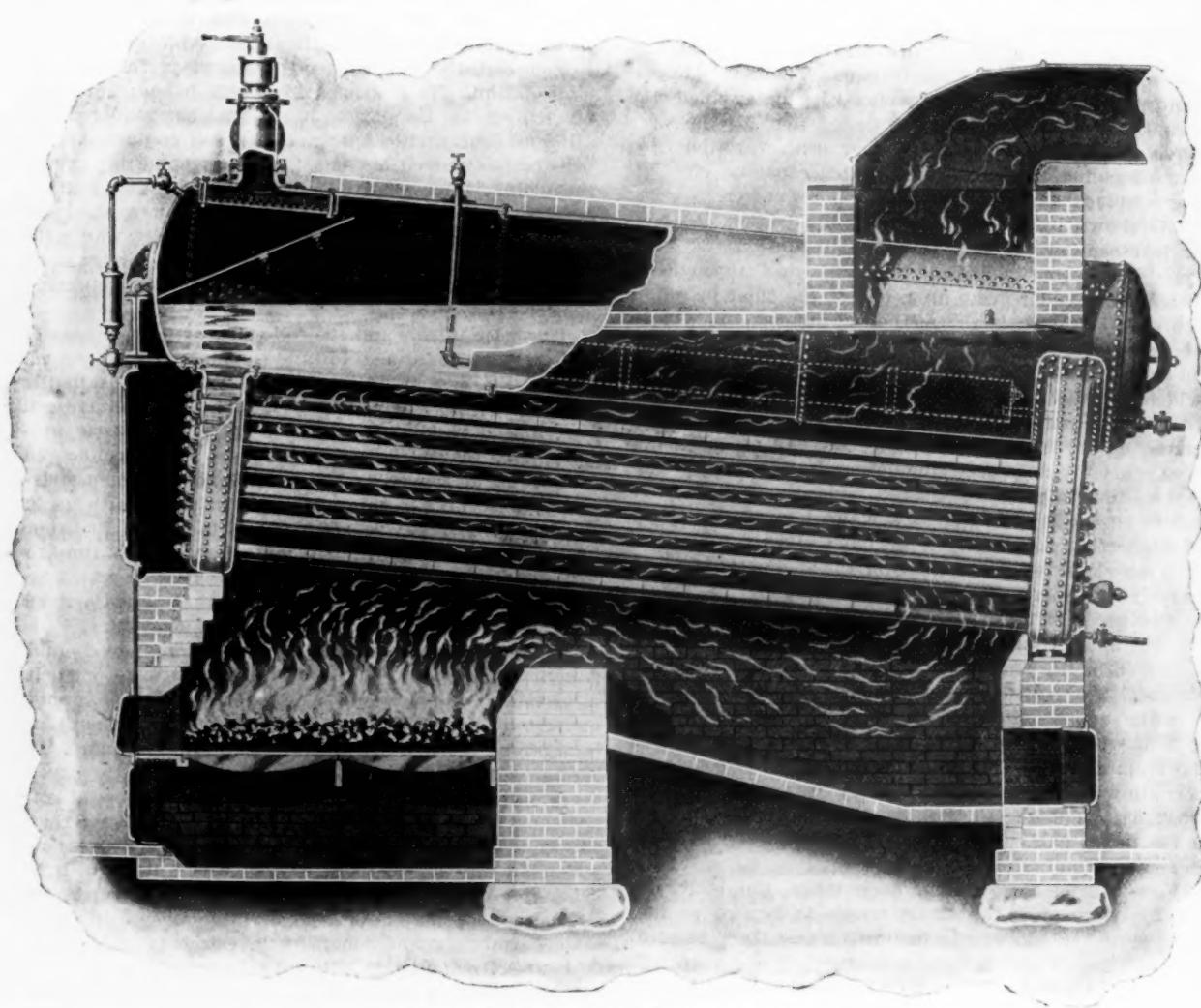
The Franklin Water Tube Boiler.

In considering the development of the water tube boiler there is much to commend in the methods pursued in bringing it properly before engineers and manufacturers. These methods, together, of course, with the meritorious principles of design of the water tube boiler, are responsible for the almost universal use of this type in modern steam plants.

The manufacturers of water tube boilers have carried on a campaign of education in relation to the theory of circulation and the theory of combustion, which, together with the strength and proportion of parts and the quality of materials, are necessary to produce boilers economical, safe and durable. The tremendous development of this industry has, however, brought its at-

simply more heating surface purchasers are frequently furnished with any amount of heating surface asked for, without taking into account the other important elements in the design. It has been so simple to pile a few more tubes on top of the standard, properly proportioned boiler, without altering the steam space, grate surface or circulating openings, that at present many boiler plants can be found where the requisite heating surface is provided, but at the expense of from 25 to 50 per cent. of grate area, which would be necessary were the increase of size uniform.

The Franklin water tube boiler has been designed on the plan of having all quantities and areas in every boiler as nearly as possible proportioned to the horse-power, with due allowance for the different qualities and quantity of coal to be burned on a square foot of



THE FRANKLIN WATER TUBE BOILER.

tendant evils, which are well recognized by the leading mechanical engineers as well as by designers of some of the later boilers of this type.

Owing to the variation in the design of the various water tube boilers the results of tests given out by different boiler companies have shown that some of the boilers develop their best economy on less heating surface than others, but skeptical purchasers have been wary of accepting these tests as proving the claims of the manufacturers, and have, therefore, with the perhaps mistaken idea of protecting themselves from buying boilers too small for their work, practically agreed on demanding that all boilers should be rated on the basis of 10 square feet of heating surface to the horse-power. This, while not entirely rational as a means of protection, is perhaps a step in the right direction. It is, however, decidedly ineffective if nothing further is insisted upon than that a boiler shall have a certain amount of heating surface, with nothing said about grate surface or the other factors which come into the design of a good boiler. To satisfy this demand for

grate. In other words, a 500 horse-power Franklin boiler, being twice as large as a 250 horse-power boiler, has twice the grate area, steam space, water capacity, circulating and draft openings, as well as twice the heating surface. These proportions have been determined with an aim that with the same coal and draft the 500 horse-power boiler will develop its rating and the same forcing capacity at the same economy as the 250 horse-power boiler. This uniformity of proportions is based on natural draft and the use of ordinary coal, and could be changed in special cases of forced draft or special conditions. Another feature of this design is that the proportions are such as to give sufficient grate area for burning the poorer coals, so that with ordinary draft and firing they can develop their rating easily and can be forced to much more than their rating by forcing the fires.

These boilers have been designed on the basis of 10 square feet of heating surface to the horse-power, and the furnaces are figured for 2½ horse-power per 1 inch width for anthracite buckwheat coal and 3 horse-power

per 1 inch width for good bituminous coal. These quantities are arrived at as follows: For anthracite buckwheat coal boilers should be able to develop rating with natural draft when burning 17 pounds of coal per square foot of grate and for bituminous coal when burning 21 pounds per square foot of grate. For satisfactory firing, it is held, furnaces should not have grates more than 7 feet deep for anthracite or more than 6 feet deep for bituminous coal. These quantities give the following easily remembered constants: A furnace for burning anthracite buckwheat coal, 1 foot wide and 7 feet deep, will burn $1 \times 7 \times 17 = 119$ pounds coal per hour, which, at 4 pounds of coal per horse-power, gives $119 \div 4 = 30$ horse-power per 1 foot width of furnace, or $2\frac{1}{2}$ horse-power per 1 inch width of furnace. A furnace for burning bituminous coal, 1 foot wide and 6 feet deep, will burn $1 \times 6 \times 21 = 126$ pounds coal per hour, which, at $3\frac{1}{2}$ pounds coal per horse-power, gives $126 \div 3\frac{1}{2} = 36$ horse-power per 1 foot width of furnace, or 3 horse-power per 1 inch width of furnace. These two important factors in the design having been determined, the Franklin boilers are so proportioned that all the sizes have, with no more than $3\frac{1}{2}$ per cent. variation, the same amount of steam space, water capacity, circulating openings and draft areas per horse-power.

As shown by the accompanying illustration, the boiler is essentially of the standard inclined water tube type. It is constructed of wrought steel throughout. Besides the wider grate area, one of the chief points of individual interest is the method of support. It will be observed that the front end of the boiler is supported on cross beams resting on and bolted to steel columns which extend to the foundation. A lug is riveted to the front head and bears on a roller set in a roller chair placed on the cross beams. The rear end of the boiler is supported on the rear foundation wall, which is carried up for the purpose. On this wall are set plates and rollers on which rests the back water leg. This method of supporting the boiler, being independent of the setting, provides for any change in the inclination of the boiler and for expansion and contraction.

Another new feature in the construction is found in the sectional fronts. The upright columns and cross beams form the frame work of the front. Small cross channels are bolted to the upright columns and support the upper half of the front. The lower half consists of wrought steel plate panels, to which are bolted the frames for the fire and ash doors. This construction allows for the removal of any part or the entire lower half of the front without disturbing the supports or the upper half. This is very desirable when it is intended to install stokers.

For insuring dry steam, even when the boiler is heavily overloaded, the steam nozzle is located at the front or upper end of the inclined drum; there is also a steam separating device, consisting of a perforated dry pan and a deflection plate. Inside the drum, below the water line, a mud drum of thin steel receives the feed water and retains the incoming impurities. These are blown off at intervals through a blow off pipe extending through the rear head. The mud drum also serves to take the chill off of the feed water, as it is submerged in water of high temperature.

Cleaning and inspection can be carried on while the boiler is in operation without the admission of cold air in the setting. Hollow stay bolts are so arranged in each water leg as to permit of this. In the outside plate of each water leg hand holes are placed directly opposite the ends of each tube, and are fitted with plates and gaskets so constructed that the internal pressure keeps them tight. For a thorough cleaning of the inside of the tubes it is only necessary to remove the front hand hole plates to admit the scraper, which pushes the scale into the rear water leg, from which it can be taken by removing a few of the hand hole plates in the bottom row. The opening in the drum is sufficiently large to permit the insertion of a torch, so that inspection can be made in a similar manner to the cleaning.

The cleaning is all done from the front and rear of the boiler, so that any number of boilers can be set in one battery.

The boiler is built by the Franklin Boiler Works Company of Troy, N. Y. The Washington Company of 39 Cortlandt street, New York, are the general selling agents.

The American Situation, Its Strength and Weakness.

From an English Workman's Standpoint.

BY STUART UTTLEY.

SHEFFIELD, December 6, 1901.—Although Americans and Englishmen have many things in common, there is one feature in which they are very dissimilar. The Britisher doesn't care what foreigners think about him. He looks with lofty disdain upon the competition of foreign rivals, and he would as soon think of shaking hands with the man in the moon as of asking the Frenchman, the German, or the American for his opinions of him. He has been long established; he thinks himself secure; his success in the past has rendered him self confident, and to a large extent self contained. Albeit he has proved his smartness in keeping his eye on the main chance. On the other hand the American, as becomes a young man who has opened a new shop and is advertising it for all it is worth, naturally wants the opinions of outsiders and is apt to ask a foreigner on the day after he has landed, "Well, what do you think of us?"

I propose in this and the following articles to answer this question, so far as trade and commerce are concerned. One of the first things which strikes the transatlantic visitor is the terrible earnestness of the people. He can see palatial residences, miles of shipping, electric railways and marvelous subdivisions of labor in the old world, but go where he will he will not find men striving with such desperate energy to amass wealth as in the States. It really seems to an old fashioned Britisher as though the American did not allow himself time to eat, sleep or even laugh; these are luxuries in which he may possibly indulge in time, but ere that period arrives he is going to shake the old world up a good bit.

Although the American press is Argus eyed, and Americans abroad keep their eyes pretty wide open, it is certain that the people of the United States cannot understand the alarm with which American competition is regarded in Great Britain, France and Germany. It is indeed the bogey of Europe, and every little paper takes up the burden of lamentation and discusses the expediency of retaliation. There can be little doubt that one of the effects of the severe commercial depression which has already assailed the old world and which is being felt with such terrible effect in Germany will be an energetic demand for heavier protective tariffs and some curtailments of American investments in Europe. Of course Great Britain will not take part in such a selfish policy, still the competition of the States is stimulating English manufacturers to greater exertions than they have ever shown before. America, however, enjoys such a unique position that she can well afford to regard the efforts with equanimity. Her chief strength lies in the fact that she can be entirely independent of the outside world, whereas Great Britain would starve and Germany and France be seriously inconvenienced were their oversea food supply cut off, and many of their industrial concerns be closed if their foreign trade was lost, while on the other hand the people of the United States would be well employed in supplying themselves even if their trade connections with the rest of the world were entirely cut off. These possibilities are well illustrated by the fact that although the great republic is not very much less in extent than the whole of Europe, her population is more than one-fourth less. Assuredly the future is with America, and the statesmen and captains of industry in the old world know it.

On the principle that what is one man's food is another man's poison, the protective system has been the salvation of American trade. But for it the British goods, being so much cheaper than those produced in America, would have flooded the markets and have made the creation of an industrial system impossible. On the

other hand it is certain that the application of such a system to England would have meant hopeless ruin. She, however, had fully half a century start of all rivals and strongly entrenched herself in the world's markets.

This, however, shows to an impartial observer like myself that while the application of protection may be absolutely necessary to establish an industrial system, especially in face of such competition as that of Great Britain, there must come a time when that system must be abandoned in favor of free barter in the neutral markets of the world. It is obvious that if America still finds it necessary to impose restrictive tariffs in order to checkmate cheaper foreign goods she cannot possibly hope to successfully compete with such goods in neutral markets where she has not the benefit of protection. On the principle that facts are stubborn things it may no doubt be urged that American locomotives are being supplied to India and even to England, bridges to Egypt and rolling stock to South Africa. Just so. In order to explain this apparent contradiction it may no doubt be contended that American manufacturers make such big profits owing to the protective tariffs that they can afford to supply a good many articles practically at a loss.

If this assumption be correct it must, in my opinion, be regarded as a very dangerous policy. If American articles are sold at a loss abroad for the purpose of capturing foreign markets some one has to pay the piper. As this will not be the manufacturer, then it is obvious it must be the consumer. It is in effect a bounty, and bounties are like boomerangs, they invariably strike the hand that threw them. Take the well-known case of sugar bounties as an illustration. In order to capture the sugar trade France, Germany and other European countries gave substantial bounties on sugar, and the British consumer is thereby enabled to get his sugar at $2\frac{1}{2}$ cents per pound, while on the other hand the consumers in the bounty giving countries have to pay 6 cents per pound for theirs. But despite this the British sugar trade has not been absolutely ruined, but latterly has been improving, to say nothing of the enormous confectionery, jam and biscuit industries which have been created by the introduction of bounty fed sugar.

So long, therefore, as protection was exclusively applied to the home trade of the United States it has been a tower of strength, but now that she is making a big bid for the trade of outside markets it will, I venture to assert, be a source of weakness and will effectually prevent her making headway.

I am perfectly well aware that these views will not find favor with many Americans who regard protective tariffs as their sheet anchor, and who would as soon think of crossing the Atlantic in a washtub as abandoning their favorite protection. The fact remains, however, that protection gets credit for a good many things which it has had nothing whatever to do with. The marvelous mineral wealth of the country, the unrivaled waterways, the rich virgin soil of the far West, the untiring energy of the people, the constant influx of the more enterprising myriads from the old world, the splendid climate, the absence of ancient vested interests and unrestricted monopolies, the freedom from militarism and the land practically free from the grasp of the militant aristocracy are all advantages which would more than outweigh the most mischievous and narrow fiscal system. I am, of course, expressing myself as an Englishman, who has the most unbounded confidence in free trade, but I unhesitatingly assert that from the moment the great republic adopts the free trade policy she will become England's most serious rival in the world's markets. The fact is that British statesmen, manufacturers and economists really dread the adoption of such a policy by the United States.

Nothing more aptly illustrates the strength of America over her trade rivals than the facilities she offers for the inventive faculties of her sons and others. Europeans have long been hide bound by their patent laws. Before any one could get their inventions taken they have to find a good many dollars to secure the rights, and many a poor man has either had to surrender his discovery or to share it with some richer man, who could find the money to carry it through. This has had a very deterrent effect upon inventive genius, and many

workmen possessing splendid ideas, but finding no encouragement to develop them, have carried them to the grave.

It is altogether different in America. Here every facility is given for the crystallizing of new ideas, and even down to the farm laborer, working the reaper and binder, every one knows that if he hits upon a good idea he has a very good chance of reaping a rich harvest. At the first blush such opportunities may appear of slight moment. Slight consideration, however, shows that its effect upon American industries has been simply amazing. It has not only stimulated her citizens to exercise their brains to the fullest capacity, but it has drawn a very large number of the smartest and most inventive workmen from Great Britain and other foreign countries. The consequence is that to-day America stands at the head of the inventive nations, and her labor saving machinery and subdivisions are the marvels and admiration of the world. All this has had a most powerful effect in cheapening production. I had many conversations with Britishers on this subject while in the States, and they were unanimous in their opinions and experiences that the much better facilities for securing inventions gave to workmen chances such as were never experienced in the old world. As it used to be said that every soldier of the first Napoleon carried a field marshal's baton in his knapsack, so it may be said that it is possible for any American workman to become a millionaire. It takes at least two generations of unremitting toil, inventive genius and exceptionally good fortune to produce a millionaire in England or Germany, but the history of Andrew Carnegie and other well-known Americans shows that in America it is quite possible to create one in ten or 20 years. All this is but another way of saying that brains and ability have a far better chance in the States than in any other country in the world. The opportunities for the individual in America constitute one of its strongest features.

The system of education in America is much better than in Great Britain, and it is possible for the poorest to receive an education which can only be obtained by the higher middle classes in the latter country. In this respect the munificence of some of America's wealthy citizens is worthy of the highest praise. Wise in their day and generation they foresaw that to enable the youth of their country to obtain a first-class education was the finest of legacies. They endowed schools and colleges and created scholarships in a manner never dreamed of in England. This, supplemented by the liberal grants for educational purposes made by the various States, has enabled a first-class technical and commercial education to be given at a comparatively trifling cost.

So far as labor saving machinery and methods of working are concerned I am bound to confess that I was simply amazed at what I saw in the States. Although I have an intimate knowledge of many of the most important iron and steel works in England I found much in the course of my visit to the great iron and steel centers of Cleveland and Pittsburgh which impressed me as to the great progress made in the States. The system of mixing the ores and charging the furnaces, the utilization of the waste gases, the application of mechanical appliances in dealing with large masses of molten metal, the enormous output of individual blast furnaces, the rapidity with which large steel ingots are rolled into billets, &c., with a very small amount of labor, the improved arrangement of the crucible steel furnaces, enabling a much larger output to be obtained with the same amount of labor, along with a score of other things in the same direction, made a very powerful impression upon my mind. Little wonder that the Steel Trust and others threaten to monopolize the steel and iron trade of the world. When America succeeds in combining durability and good workmanship with her present quick production and consequent cheapness she will become a most powerful, if not the most powerful, factor in the world's markets.

The general application of mechanical inventions to agriculture gives America an enormous advantage over her rivals in Europe. In England agriculture is a declining industry, and even in Germany it is being neg-

lected in favor of industrial occupations. Everywhere in the old world there is a swarming of men cityward, and a consequent dependence on outside sources for food. On the contrary America, by applying the mechanical arts to husbandry, has reduced drudgery to a minimum, and, while cheapening food, has rendered the occupation a more agreeable one. The decadence of agriculture throughout Europe is indeed yearly becoming more serious. On the other hand I was profoundly impressed with the widespread and abundant evidence of the vitality and progress of agriculture in the United States. The fact that she has two such important strings to her bow gives her an enormous advantage over her international rivals.

Now I venture to think that America's most serious danger is the amazing development of trusts. The power which tends to place money in the pockets of the few at the expense of the many, which displaces the smaller tradesman, reduces the quantity and value of labor and increases the cost of the commodities of life to the masses, while it only enriches a comparatively already wealthy few, is a power which contains elements most dangerous to the community and requires careful watching by all interested in the continued progress and prosperity of the nation.

Rightly or wrongly, Englishmen believe these gigantic monopolies to be the direct outcome of protective tariffs. Nothing indeed is so certain as that if such a state of things arose in England there would be fierce and successful agitation for Parliament to interfere to curtail the abuse of power by monopolies. Indeed, it is not so many years ago that a very strong demand was made for the legislation to put a stop to the cotton corner, and it only ceased when the ring collapsed. No government in the world would be allowed to sanction the cornering of grain, as was done two or three years ago in the States.

I have already indicated that Europe is becoming alarmed at the acuteness of American competition, and we are within measurable distance of severe retaliatory tariffs on the part of France, Germany and Belgium. Added to this even America cannot escape the serious depression which is creeping over the commercial world, and when it does visit the United States it will give rise to dangers from which the countries of the old world, and especially England, are free. The disorganization of labor is a matter of very serious moment to the United States. During the last great engineering strike in England, when over 80,000 men were out for six months, not a shot was fired. There was not a single riot, very little disorder, and when closed it left scarcely any ill feeling. The fact was that being well organized they were under good discipline, and being fairly well provided with the means of subsistence were not driven to the desperation of starving men, hence they were enabled to rely on a passive resistance. One has only to ask what would have been the result in the United States of a prolonged strike in one of the leading industries wherein a great majority of the men were without any means of subsistence and under no proper control. As one who has had a long and varied experience of men and things I should tremble for the result, and to every mind in this direction lies one of the serious dangers to America's future. In Great Britain organized capital and labor are both sufficiently strong to respect each other's opinions and to lend a willing ear to the voice of conciliation, but from what I saw and heard in the States organized capital is the giant, and organized labor the dwarf. It is pretty much the same in industry as in other domains of human enterprise—history repeats itself. In the early days of British industry, when labor was unorganized, riots and disorder were frequent.

I hope that I am mistaken, but, judging from what I gathered while in the States from sources well calculated to form correct opinions, I fear that the most momentous danger before America is an individual war such as the world has never seen before.

The stronger the trusts grow the more powerless will labor become. As it cannot obtain redress from Congress in a similar manner in which British labor can from Parliament, and finding that the few

are growing enormously wealthy while the many are steadily sinking into poverty, it may perchance strike out fiercely, wantonly and madly like a blind, enraged giant.

It is not for me to suggest remedies or to indicate the path of prudence. That would be impertinence on my part. Allow me, however, in closing, to say that nothing so strongly impressed me while in the States as the collective impotence of labor and the growing and crushing might of the trusts. Sooner or later that well organized body will stand face to face with the horny handed, undisciplined and uncontrolled multitude of workers, and then the real trial of strength will begin, and after that—the deluge.

Pacific Coast News.

SAN FRANCISCO, CAL., December 9, 1901.—As long as the machinists' strike lasts it will be the principal theme of conversation in the manufacturing section of the iron trade and the principal matter of interest to all who treat of trade matters here. For the enforced idleness of one-half of all the workers in the manufacturing section of the business not only affects them and their employers, but all who supply raw material of whatever kind, such as pig and scrap iron, copper, &c., as also various articles of hardware and supplies, which are used in carrying on the business. Hence every move which is made toward bringing the strike to an end is naturally regarded as of the first importance. It is not easy to say how nigh the end is, but little by little it is coming to a close. It is not easy to get at the exact facts of the case in every instance where the strike comes to an end, as both parties are reticent, but in many cases it is a matter of give and take and a saving of appearances. The nine-hour day of the winter season is a good excuse, and when the winter is over an extra hour can be given the appearance of overtime. In this connection I have to record another settlement of the strike. The Oakland Iron Works have been running on a nine-hour schedule since December 6. Here the machinists, molders and blacksmiths have the best of the settlement, if that can be called best which involved almost six months' idleness and an average loss of \$432 to each man employed. The basis of the arrangement is nine hours and an increase of 2½ cents on the pay per hour. Thus a man earning \$3.50 a day of ten hours, or 35 cents an hour, now secures 37½ cents per hour, or \$3.37½ per day. His weekly wages aforesome were \$21, now they are \$20.25. He receives a little over 7 per cent. increase in wages instead of 11½ per cent., as asked at first. Of course, the higher the daily wages the lower the per cent. of advance. The Judson Iron Works and the Oakland Works, outside of the Best Agricultural Works, are the only places of importance in this line across the bay. Best holds out still. In this city the Union and the Risdon and the other large places outside of those that have already made a settlement still hold out. And the year is about to close with this calamitous strike still going on, though with fair prospects of coming to an end. No doubt mutual concessions will be made by others of the parties to the struggle, and the end will be still nearer. The work done by the large establishments places them more directly in the way of Eastern competition than those who have settled, and it is difficult to see how they can do any different to what they have been doing. And indeed if matters have to be tied up as they have been it is difficult to see how the foundry and shipbuilding business can be carried on in San Francisco. With the highest wages and the highest priced material on the continent it is impossible.

Outside of the disturbance in the manufacturing section everything appears to be going on swimmingly. Trade in hardware, plumbing materials and oil well material is still good, though business in the latter department is not as active as it was earlier in the year. The export trade is good, and the demand for machinery, &c., from the Hawaiian Islands, Mexico, Central America and Australia is good. There is also a large demand from the Orient. The "Doric," which cleared the other day for Hong Kong and Yokohama, had a cargo valued at \$365,000, a large part of it machinery, hardware, bi-

cycles, wire, nails, electrical goods, &c. Most of them were goods in transit from Eastern manufacturing centers. The "Sierre," for Honolulu and the Australias, had large consignments of machinery, engines, &c., and some trade in these lines is developing with South America through the new steamship lines.

The manipulation of copper and copper stock is not likely to do any good to the producers of California. It was the advance in price that gave the impetus to prospecting and production in this State, and any big reduction in the price would work great injury to what is now a highly profitable industry. Last year's production, in round numbers 30,000,000 pounds, was principally in Shasta County, where a few years ago there was hardly any produced.

The Clearing House exchanges are still largely ahead of those of 1900, and everything foreshadows a good business year in 1902. We have had an abundance of rains during the past two weeks, and the ground is in the best possible condition for tillage. Everything looks bright.

J. O. L.

The Potter Mesh Separator and Superheater.*

BY FREDERICK A. SCHEFFLER.

Various designs of dry pipes have been made, all of them with a view of accomplishing the same result—

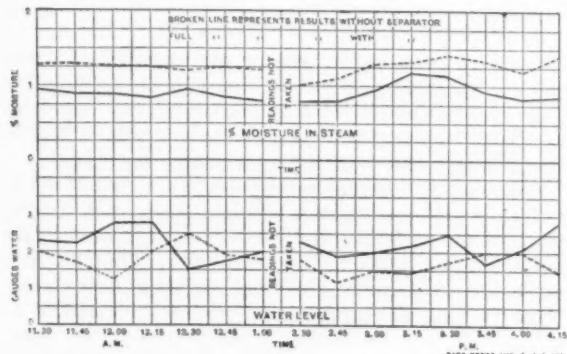


Fig. 1.—Diagram of Tests.

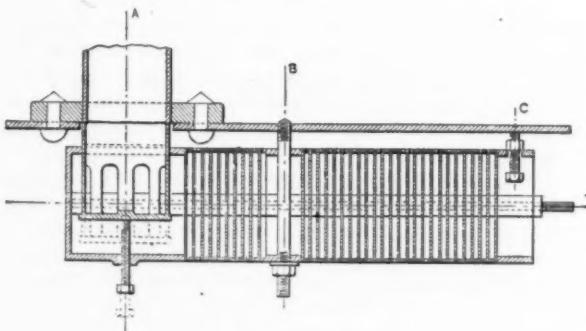


Fig. 2.—Longitudinal Section.

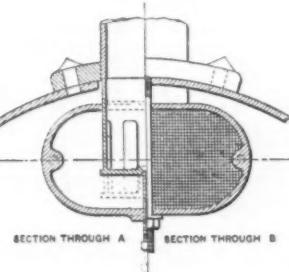


Fig. 3.—Sections Fig. 2.

THE POTTER MESH SEPARATOR AND SUPERHEATER.

namely, that of affording a receptacle for the steam passing out of the boiler, and so devised that steam only, and no water, should pass through the dry pipe. The very fact that these various forms of dry pipes (sometimes deflectors were used) have been changed in design, and also that in many instances the dry pipe has been abandoned for another device equally deceptive, without eliminating the difficulty, is proof that none of the old methods were satisfactory under all circumstances, and that a form of dry pipe which might be suitable in one case would not apply in another equally well.

I have no doubt that many members in reading or discussing this paper can recall their experience with

priming or foaming boilers, and what they did to prevent disastrous accidents from occurring to their engines and other machinery. This is an experience which many of us have had.

It is a well-known fact that under certain operating conditions even the best designed boiler is likely to "throw water," or prime or foam badly. This may be due to various causes, which we have not the time to discuss now, and frequently is not due to improper construction of the boiler.

The Potter mesh separator is designed to prevent the trouble above referred to from occurring within the boiler itself, and while boilers equipped with the apparatus may prime for various reasons, the separator makes it impossible for the boiler to "throw water." The device is placed in the steam space of the boiler, and is connected in a manner similar to a dry pipe, or it can be connected to the end of the dry pipe and the holes in the latter stopped up.

The construction of the separator is shown in longitudinal sectional elevation, Figs. 2 and 3, and consists of a series of galvanized or copper wire meshes or screens placed alternately between rings of cast iron, there being generally from 25 to 30 layers of mesh. The area of the screens depends on the size of the boiler outlet.

After considerable interesting experimental work, involving many other designs, more or less complicated, the above construction is found to fulfill all conditions of priming, oversaturated steam, &c., and delivers at the boiler outlet practically dry steam.

It has also been found by careful experiment that, given any boiler from which steam is delivered at any particular range of moisture (with or without dry pipe), the introduction of the mesh separator in the same boiler will change the quality of the steam by from 25 to 75 per cent. (making it drier), and at the same time stop any priming which may have been present.

The theory on which the action of this separator is based is, as may already have been surmised, that the small globules of moisture contained in the steam are broken up by the first piece of mesh, and this action is continued through each successive layer of mesh until it is so completely atomized upon reaching the outlet chamber, or header, that it flashes into dry steam upon the addition of a small amount of heat, which is obtained by the wire drawing due to the steam and wa-

ter passing through the screens. The reduction of pressure is about 1 per cent., and the temperature of the steam is increased proportionately.

The separator is designed so that it can be placed in any type of boiler which is equipped with a manhole of the usual size (11 x 15 inches), and is held in position by one or more studs screwed into the shell of the boiler. The connection between the outlet of the separator and boiler outlet is not necessarily steam tight, nor are the joints between the faces of the rings and wire mesh steam tight, as these openings are so small that any steam which leaks through such spaces is slightly wire drawn, with the same result which occurs to the steam passing directly through the mesh of the separator. These small openings on the lower part of the separator also provide the means whereby the entrained water re-

* Paper presented at the New York meeting of the American Society of Mechanical Engineers.

turns to the boiler as it trickles down the successive layers of wire mesh.

Tests recently made by the writer in a 3000 horse-power electric plant with and without the separator are graphically shown in Fig. 1, together with water level readings taken simultaneously with the calorimeter readings. These readings were taken every minute for five minutes over several hours' duration, at ten-minute intervals, and in plotting the curve it will be noted that the average readings for each five minutes were used to give the ordinates. A Carpenter throttling calorimeter was used, as the readings at no time exceeded 2½ per cent. of moisture.

In this particular case the tests show that the steam issuing from the boilers contained 37½ per cent. more moisture when the separators were not used than was the case when they were used, and this notwithstanding the fact that the water level in the latter instance averaged materially higher than in the former. Before these separators were installed this particular plant was frequently troubled with water in the engines, but this difficulty has entirely disappeared; so that, as heretofore stated, the separators prevent the water from leaving the boiler, besides supplying a higher quality of steam.

This test was made on boilers which, as the curve shows, would ordinarily furnish a very fair quality of steam, and the test casts no reflection on the makers of the boilers. If, however, by applying the improvements in dry pipe construction, the possibility is assured of keeping the water in the boiler, and at the same time increase materially the quality of the steam at the boiler outlet, then the plant as a whole is improved in efficiency. There will be far less condensation to take care of in such installations between the boilers and the engines, and there will also be eliminated the likelihood of damaged engines, providing the condensation is properly looked after.

Standardization of Engines and Dynamos.*

A committee, composed of James B. Stanwood, Frank H. Ball, Wm. D. Forbes, Walter M. McFarland and Albert L. Rohrer, on the standardization of engines and boilers, made their final report at the New York meeting of the American Society of Mechanical Engineers:

The committee's investigation has covered the standardization of the following points:

The standard sizes of units recommended.

The corresponding revolutions per minute for these units.

The sizes of shafts for the two classes of center crank and side crank engines.

The length along the shaft required for the generator.

The height of axis or shaft over top of sub-base.

The width of top of sub-base.

Armature fit.

Overload capacity of engines and generators.

Brush holders.

Holding down bolts, keys and outboard bearings.

Size of Units.

Our endeavor has been to reduce the number of standard units to the fewest sizes. This will commend itself to all manufacturers as tending to reduce the great number of patterns required to be kept on hand. For reasons stated in our report to the Milwaukee meeting the largest size embraced in our list is 200-kw. capacity.

In this connection our report only covers the standardization of direct current generators.

Revolutions.

These standard speeds have been chosen after careful deliberation and investigation of the practice of all the engine and generator builders in the country. It will be observed that we have provided for a permissible variation of speed of 5 per cent. above or below the mean speed, which we recommend; an examination of the practice of all the engine and generator builders

shows that this covers practically all the machines which may be considered as a standard make at the present time, and we have been assured by some builders whose conditions differ somewhat that if there is a general agreement upon the scheme outlined they will be prepared to change their machinery to conform to the recommendations.

Shaft Diameters.

These are also the result of careful analysis of the existing practice of all manufacturers and a consideration of all the conditions affecting the diameter of the shaft. The preliminary report which we sent out to the manufacturers has elicited only a few adverse criticisms, and these, after correspondence, were withdrawn.

In order that the reason for the diameters of shafts that we have recommended shall be thoroughly understood, we may explain that (especially in shafts for side crank engines) the permissible deflection has determined the diameter. This, in some cases, is larger than would have been necessary for torsion and bending where deflection did not have to be considered.

As cases sometimes arise where cross compound engines or double engines are connected to generators coming within our recommendations, and as such units require considerably larger shafts than those given in our tables, we deem it necessary to state, specifically, that our recommendations apply only to engines of usual proportions, with the generator attached at the side of, instead of between, the cranks.

Length of Generator Along the Shaft.

When we came to investigate the question of length along the shaft (between limit lines) to be provided for the generators, we found that the practice of manufacturers required provision for two classes, which may be called "long" and "short" generators.

It would, of course, have been much better if we could have provided for but a single class, with a small allowance for variation, but there is such a marked difference in the lengths for the same power that we have deemed it best to make provision for these two classes, so that the engine builders can govern themselves accordingly. It will be noticed that the maximum difference in lengths between the two classes is 6 inches, which in the small sizes is reduced to 5 inches.

In the case where an engine is to be provided for a generator which falls into the long class, but which is only a little over the limit for the short class, or one which is considerably less than the maximum of the short class, the excess clearance is to be provided for on the side next to the engine—that is to say, the side away from the commutator.

We have carefully considered the fact that for these varying lengths of generator and shaft the engine builder has to provide different lengths of sub-base, and in order to reduce the expense of patterns here to a minimum our idea is that these patterns would be made so that the end away from the commutator can be extended the necessary amount, 5 or 6 inches, to take care of the increased length of bed. Obviously this means simply a standard pattern with a standard adjustable end for each unit.

Height of Shaft.

As is well known, there are two classes of generators to be provided for under this head—those which are split vertically and those which are split horizontally. The former have a flat base, which rests directly upon the flat top of the sub-base, while the latter have feet which take the weight of the generator.

In order to arrange that the engine builders' patterns may be reduced to a minimum and still may be stock patterns, which will fit every style of machine, we have chosen dimensions for height of axis of shaft above top of sub-base sufficient to allow for the vertically split machines, and also, except as stated later, to clear the periphery of the horizontally split machines.

As will be seen, the scheme provides for a main pattern, to which patterns for the stools and seatings for both horizontally and vertically split generators can be attached before the pattern is sent to the foundry--

* Report of Committee appointed by the American Society of Mechanical Engineers.

stools for the horizontally split machines and rectangular seatings for the vertically split machines.

In the case of the 150 and 200 kw. units we have provided for a recess in the top of sub-base, to allow the lower part of some horizontally split generator frames to be accommodated, and so to avoid unduly raising the center of the shaft. In the case of the vertically split machines and those which are split horizontally and do not need this recess, the top of the sub-base will be flat and continuous.

Width of Top of Sub-Base.

This has been decided by careful examination of existing practice, and we believe that the figures we have recommended will cover the necessities for all sizes of generators.

Armature Fit.

The matter of armature fit has received very careful consideration from the committee, and our recommendation is for what is known as a single fit.

We have obtained the opinions of manufacturers in respect to the allowances to be made for a pressed fit and find that allowances of 1-1000 inch for shafts 4 inches to 6 inches, inclusive, and 2-1000 inch for shafts 6½ inches to 11 inches, inclusive, represent the best existing practice.

The armature bore is to be the exact size given in the table, and the allowance is to be made by the increase of diameter of engine shaft.

connected unit should not, in any case, exceed 25 per cent. of the rated capacity.

It will, of course, be understood that under these conditions of overload the economy of the unit should not be expected to be as high as when operated at the rated load. We have also been asked by some engine builders to call attention to the importance of giving the unit special attention when it is so operated.

If under peculiar conditions a higher overload capacity is demanded it must be understood that this is a special case not covered by the standard machines and provision must accordingly be made for meeting this demand.

Brush Holders.

We recommend what we believe is now the practice of the best generator builders, that the brush holder rigging shall be supported upon the generator frame. This, we think, will commend itself, as it makes the electrical part of the outfit entirely self contained.

Holding Down Bolts, Keys, and Outboard Bearings.

We recommend that the holding down bolts, shaft keys for securing the generator hub to the shaft and the outboard bearings should be furnished by the engine builders. This is in accord with almost universal practice at the present time.

Our recommendations in these particulars do not cover matters of so great importance as some others; but, if adopted, they will tend to settle certain points

Table of Sizes, Speeds and Standardized Dimensions of Direct Connected Generating Sets.

Capacity of Unit, Kilowatts.	Revolutions per Minute.	ARMATURE BORE.		DIAMETER OF ENGINE SHAFT AT ARMATURE FIT.		SPACE OCCUPIED ON SHAFT BETWEEN THE LIMIT LINES.		Length of Extension Piece, Inches.	C. Height of Axis of Shaft above Top of Base, Inches.	R, Inches.	D. Width of Top of Sub-Base, Inches.	KEY (A FEATHER).				HOLDING-DOWN BOLTS.	
		Centre Crank Engines, Inches.	Side Crank Engines, Inches.	Centre Crank Engines, Inches.	Side Crank Engines, Inches.	Long Class A, Inches.	Short Class A', Inches.					Width, Inches.	Thickness, Inches.	Depth in Shaft at Edge, Inches.	Projection above Shaft at Edge, Inches.	Diameter, Inches.	Number.
25	310	4	4½	4 + T ₁₀ ¹ ₀	4½ + T ₁₀ ¹ ₀	30	25	5	28½	Flat.	48	1	½	½	½	1	4
35	300	4	5½	4 + T ₁₀ ¹ ₀	5½ + T ₁₀ ¹ ₀	33	28	5	25	Flat.	54	1	½	½	½	1	4
50	290	4½	6½	4½ + T ₁₀ ¹ ₀	6½ + T ₁₀ ¹ ₀	37	31	6	28	Flat.	60	11	½	½	½	1	4
75	275	5½	7½	5½ + T ₁₀ ¹ ₀	7½ + T ₁₀ ¹ ₀	43	37	8	31	Flat.	66	1½	1	½	½	1½	4
100	260	6	8½	6 + T ₁₀ ¹ ₀	8½ + T ₁₀ ¹ ₀	48	42	6	34	Flat.	72	1½	1	½	½	1½	4
150	225	7	10	7 + T ₁₀ ¹ ₀	10 + T ₁₀ ¹ ₀	51	45	6	37½	41½	84	1½	1½	½	½	1½	4
200	200	8	11	8 + T ₁₀ ¹ ₀	11 + T ₁₀ ¹ ₀	54	48	6	42½	47½	96	2	1½	½	½	1½	4

Five per cent. variation of speed permissible above and below speeds in table. Distance from center of shaft to top of base of outboard bearing may be less than C (to suit engine builders), though not less than possible outside radius of armature.

We believe that, in order to secure the best results, it will be necessary to work to a definite gauge; to this end we recommend that the generator builder furnish a gauge the exact diameter of the bore and the engine builder make the necessary allowance for the pressed fit, as recommended. This will avoid uncertainty as to the responsibility for the fit.

Overload Capacity of Engines and Generators.

All the features of our recommendations have so far had to do with the question of dimensions as affected by the mutual relations of the generator and the engine. An important point, however, which affects both the generator and the engine, is that of the overload capacity which can reasonably be expected. As is doubtless well known, generator builders are frequently called upon to provide, during short periods, for overloads of as much as 50 per cent., and, in occasional cases, of even 100 per cent.

It is evident to every engine builder that to provide an engine large enough to drive the generator under such extreme overload capacities gives an unreasonably large engine for the rated load and seriously interferes with the economy with which the power is produced.

Bearing in mind that our recommendations are entirely for standard practice, we are led to recommend that the standard overload rating of any direct con-

about which there has occasionally been dispute and considerable controversy in correspondence.

In the table will be found columns showing sizes of shaft keys which we recommend; also the number and size of holding down bolts.

It will be noticed that we do not give any lengths for keys. We give this matter very careful consideration, but we found that such differences of opinion existed in respect to proper length that we believe it best to leave the determination of the length of key for adjustment by engine and generator builders in each individual case. Sizes of keys have been taken so that standard rolled stock can be employed.

We recommend that the keys be made straight and be used as feathers. They should therefore fit accurately on the edges and not on the top. Proper allowance should be made in cutting the keyway in the armature hub, so that there will be sufficient clearance at the top of the key.

Suggestions.

In the course of our investigation our attention has been called to a number of points which, from their nature, are not exactly in the same category as those on which we have made recommendations, but we consider them of such importance that we desire to offer them as suggestions for consideration by members of the

society, with a view to their adoption if considered sufficiently meritorious.

Pressing Armature on Shaft.—Usually the contract definitely provides by whom this is to be done, but our suggestion is that if there is no such provision in the contract it should be understood that the engine and generator builders shall agree who is to do this work, so as to avoid any dispute when the separate portions of the unit are delivered on the premises.

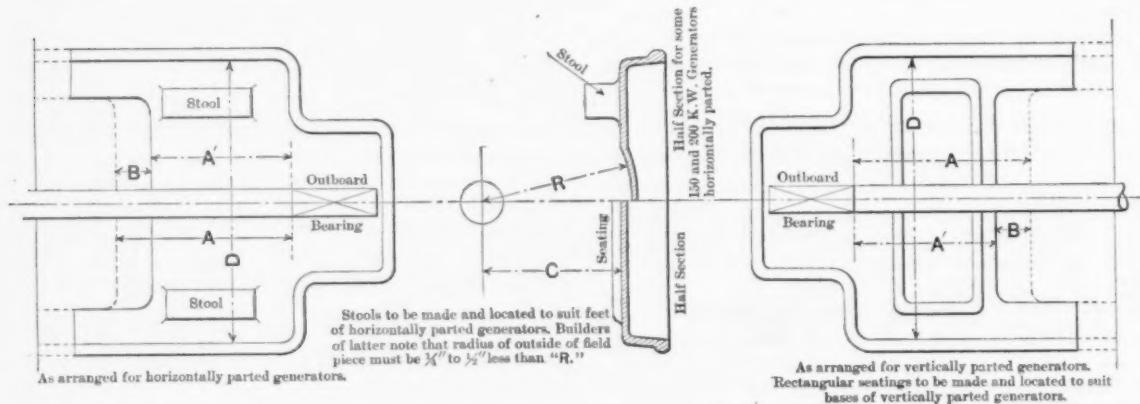
Floor Line.—For convenience in operation and for the information of engine and generator builders we suggest that for units up to 75 kw., inclusive, the floor line should come at the bottom of the sub-base; and for units 100 kw. to 200 kw., inclusive, the floor line should be 1 inch below the rough top of the sub-base.

Protecting Commutators from Oil.—In view of the fact that in some cases the distance between bearing and commutator is very small, it is well for engine builders to bear in mind that provision should be made to prevent oil from the bearing getting on the commutator.

Some generator builders have asked that the end of the shaft be drilled and tapped to facilitate, if necessary, the removal or placing of the armature on the

ing need, and the lack of which is one of the main causes of the backwardness of the interior.

In Nicaragua great improvements are projected for the principal ports—Corinto, San Juan del Norte and del Sud—all of these need deepening and dredging; new wharves will have to be built, to say nothing of fire and weather proof storehouses. In this regard Salvador has spent over \$1,500,000 at her new port, El Triunfo, and another \$500,000 spent will make it one of the safest of the harbors on the Pacific Coast. Although active work at the port of Iztapa, Guatemala, is now stopped, the Government is asking for bids to continue the dredging, on which \$500,000 or more has already been spent. About 30 miles of railroad, bridges and considerable trestle work has been built, in large part by Americans and Belgians. This port, when completed, will be the terminus of the Guatemala Inter-oceanic Railroad, across the country to Puerto Barrios on the Atlantic Coast. Most of the work on the eastern section of this railroad is in the hands of American engineers. As soon as the road has been thoroughly equipped and repaired as far as El Rancho, then the mountain section will be commenced. It is understood



STANDARDIZATION OF ENGINES AND DYNAMOS.

shaft at the place of erection; we suggest that this be done.

In some cases generator builders require special nuts, bolts, or fixtures for attaching generators to the shaft. Under these conditions we suggest that the generator builders should furnish all attachments to their apparatus that are not already specified in our report.

Central American News.

SAN JUAN DE NICARAGUA, November 15, 1901.—Any one wishing to study the effect of the making or marring of a great enterprise on a whole country should visit Nicaragua at the present time. Everything in business, all matters, political or otherwise, hinge entirely on the building of the great waterway through this country. The great majority await with anxiety the action of the American Congress, hoping that the next 60 days will end the suspense, and that we will have a great canal built by the United States. A few believe that some nation of Europe will interpose objections, and it has even been said that foreign influence has been active in the Government of Zelaya here. But even the blindest are now sure that it is an American canal, or nothing. The very existence of the present Government is wrapped up in the enterprise, and I am certain that, however erratic diplomacy here may show itself, the outcome will be that the United States will get all it should have in this connection.

Once our American Congress passes the Nicaragua bill, then Central America will be the center of the most varied business activity. An electric impulse will be given to every line of action; capital and capitalists, to say nothing of American laborers and general mechanics, will find plenty to do. The authorities here will then have means to build new roads, which are of press-

that the rails, bridges and rolling stock for the line as far as the Sierras are in treaty at present in the United States. But, as I have said before, real activity along these different lines will begin as soon as the construction of the Nicaragua Canal is decided upon. In Guatemala, Salvador and Costa Rica the higher prices now obtained for the staple of the country—coffee—are making for increased imports of coffee machinery and agricultural machinery of all kinds. Our plows, harrows and reapers are having a steady demand. American spades and shovels, axes and tools of all sorts are now seen in the stores, both retail and wholesale; whereas five years ago their places were taken by the manufacturers of Belgium, Germany and Birmingham. Bicycles are used in numbers in all the larger cities and towns, both by natives and foreigners. Eight out of ten machines are of American manufacture.

C.

Consul Bergh of Gothenburg, Sweden, reports to the State Department that Knut Ericson, a Swedish engineer, has invented an apparatus for the separation of ore by the magnetic method, and last September exhibited it before Swedish and foreign experts. The apparatus, which is described as very simple in construction, yet ingenious, attracted wide attention. A Swedish company is being organized to work the invention. It is believed that it will be of the greatest importance for mining.

The Pittsburgh Meter Company, at East Pittsburgh, Pa., a Westinghouse interest, will add two stories to their present plant, and put up an office building. New machinery will be installed, and the capacity of the concern for the manufacture of water and gas meters will be considerably enlarged.

A Brief Comparison of Recent Battle Ship Designs.*

BY NAVAL CONSTRUCTOR H. G. GILLMOR, U. S. N.

There is probably no class of design work in which what is to be done is so largely controlled by what has been done, and what is being done, as in the designing of naval vessels. The value of any vessel for naval purposes must necessarily be determined finally not only by the features embodied in the vessel itself, but by the characteristics of the vessels against which she may be opposed. It is this which makes the study of the development of foreign designs a necessity, and determines the characteristics of the vessels of the several classes which may at any time be in course of design.

While from time to time new types of vessels have been introduced and developed, there has always been a type of vessel recognized in each period as the main strength and backbone of naval force; and this type has always been designated the battle ship. It is to the consideration of the designs of vessels of this class of the present period that attention is asked. For the purposes of comparison there have been chosen the most recent designs of the several principal naval powers; and the comparison will be confined to the design conditions for those features which directly contribute to the naval value of each unit—that is to say, the armament, the protection, the speed, and the coal supply. The designs chosen are: Great Britain, the "Duncan;" Germany, the "Wittelsbach;" Russia, the "Borodino;" Italy, the "Vittorio Emanuele;" Japan, the "Mikasa," and the United States, the "Virginia." In each case there are represented two or more vessels, the naval features of which are virtually the same as that of the vessel named. The information available with respect to the latest French battle ship design is so meager as to have made it impracticable to include it in the comparison proposed.

The accompanying engravings are small scale sketches, showing these vessels in elevation and deck plan, and are given with the purpose of presenting visually the differences in naval features among them. Full data is given in the tabular statement in Table I, which follows:

Table I.

	"Virginia."	"Duncan."	"Borodino."	"Mikasa."	"Wittelsbach."	"Vittorio Emanuele."	Type design.
Laid down.....	1901	1899-00	1900	1899	1899-00	1899-00	
Length between perpendiculars.....	435'	405'	397'	400'	418'	435'	435'
Breadth, molded.....	76'10"	75'6"	76'0"	76'0"	68'0"	73'6"	76'0"
Draft, mean.....	24'0"	26'6"	26'0"	27'2"	25'0"	25'7"	..
Displacement, in tons.....	14,950	14,000	13,600	15,200	11,800	12,624	..
Indicated H. P. with forced draft.....	19,000	18,000	16,000	15,000	15,000	19,000	..
Speed, in knots, with forced draft.....	19.0	19.0	18.0	18.0	19.0	22.0	18.0
Boilers	Various	Belleville	Belleville	Belleville	Cly. and Schultz	..	..
Armament :							
Main battery.....	{ 4-12" 8-8" 12-6"	{ 4-12" 12-6"	{ 4-12" 12-6"	{ 4-10" R. F. 20-12 pdrs.	{ 4-9.4' 18-6" 20-12 pdrs.	{ 2-12" 12-8" 12-3.5"	{ 4-9.4" 12-6" 12-12 pdrs.
Secondary battery.....	{ 12-3" 8-3 pdrs. 8-1 pdrs.	{ 12-12 pdrs. 6-3 pdrs. ..	{ 20-3 pdrs. 4 Maxim	{ 8-3 pdrs. 4 2 1/2"	{ 12-1 pdrs. ..	{ 12-3" 12-1.8" ..	{ 6-3 pdrs. ..
Torpedo tubes :							
Above water.....	2	4	2	4	1	4	2
Submerged					5	..	
Protective deck :							
Thickness of slopes.....	3"	1"	2 1/2"	2"	3"	4"	3"
Thickness of horizontal parts.....	1 1/2"	2"	1 1/2"	..	1 1/4"	2"	1 1/2"
Armor :							
Length of water line belt.....	Whole length	2/3 length	Whole length	Whole length	Whole length	Whole length	2/3 length
Breadth of water line belt.....	8'0"	7'0"	6'6"	7'9"	7'0"	7'0"	7'6"
Thickness of water line belt at amidships.....	11.8"	7"	8"	9"	8.8"	9 1/4"	7"
Thickness of water line belt at ends.....	4"	2"	5 1/4"	4"	4"	4"	2"
Bulkheads.....	6"	7"	6"	6"	6"	6"	6"
Length of upper belt.....	2/3 length	2/3 length	Whole length	2/3 length	1/4 length	1/2 length	2/3 length
Width of upper belt.....	7'0"	5'6"	7'6"	7'6"	7'6"	7'6"	7'6"
Thickness of upper belt.....	6"	7"	6.4"	6"	6"	6"	6"
Protection, largest guns.....	10"	11"	10"	14"	10"	8"	8"
Protection, medium caliber guns.....	6"	6"	6"	6"	6"	6"	6"
Protection, other guns.....	2"	3"	..	14"	10"	10"	9"
Conning tower, forward.....	9"	12"	..	3"	6"	..	3"
Conning tower, after.....	5"	3"	..	14"	10"	10"	9"
Coal supply, normal.....	900	900	900	1,400	650	1,000	650
Coal supply, bunkers full.....	1,900	2,000	1,500	2,000	1,250	2,000	1,250

Armament.

In armament, uniformity of practice is found in the location of the heavy guns, but in their number and caliber a considerable range is noticeable. With but two exceptions 12-inch guns have been chosen, and, with a single exception, the number of heavy guns is four, mounted in pairs, two forward and two aft. In the "Mikasa" four 10-inch guns make up the heavy battery,

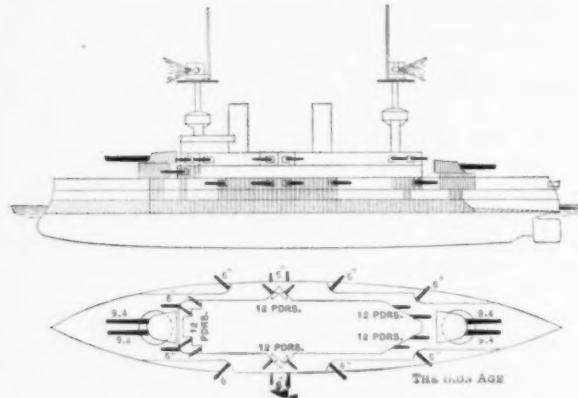
* Paper read at the meeting of Society of Naval Architects and Marine Engineers

Water Line Protection.

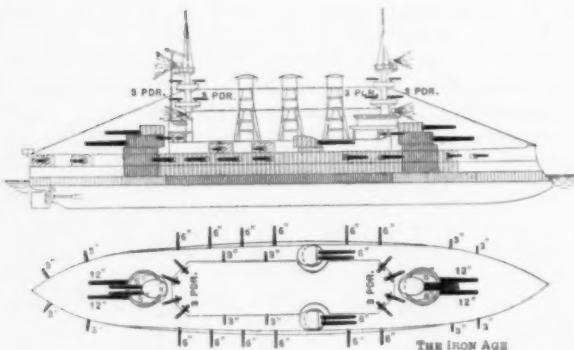
In the matter of protection to stability by a water line belt a considerable range is noticeable. The lower limit is found in the "Duncan," in which two-thirds of the length of the vessel is protected by a belt of a thickness of 7 inches, the forward end being protected from the fire of secondary battery guns by 2-inch nickel steel plates riveted upon the skin plating—as in protective decks. The remaining five vessels under consideration have, for

stability protection, complete water line belts, the maximum thickness of which is found in the Virginia—11 inches at top of armor amidships, tapering to 8 inches at the bottom. The lower limit in the extent of the upper belt, affording protection to the ammunition supply for the battery, is found in the "Wittelsbach," where this belt is limited to about one-fourth of the length of the vessel. Three of the vessels under consideration—namely, the "Virginia," the "Duncan" and the "Mikasa"—carry this upper belt over about two-thirds of the length. The "Vittorio Emanuele" has an upper belt over somewhat more than one-third its length, and the "Borodino" for the whole length. It should be mentioned, however, that in the "Borodino" both the water line belt and this upper belt are so narrow that the two combined really

the "Wittelsbach" and extended in the "Virginia" and "Mikasa." In addition to this central battery the "Wittelsbach" and "Mikasa" employ, also, isolated casemates with 6-inch armor for a portion of the guns of second caliber; and in the "Duncan" this system of protection exclusively is employed for the second caliber guns. Upon the "Vittorio Emanuele" and "Borodino" the second caliber guns are all carried in armored turrets, with 6-inch armor, and in the "Wittelsbach" and "Virginia" such turrets are combined with central batteries, or with central batteries and casemates. The exceptional features in protection and system of mounting in the superposition of 8-inch turrets upon 12-inch turrets in the "Virginia" has been the subject of so much discussion as to make special comment unnecessary. The "Borodino" and "Virginia" are the only vessels in



Type Design, 18 Knots.—Embodyes the Minimum of Speed, Protection, Armament and Coal Found in the Six Designs Sketched.



United States, "Virginia," 435 Feet Long, 19 Knots, 14,900 Tons.

Great Britain, "Duncan," 405 Feet Long, 19 Knots, 14,000 Tons.

A BRIEF COMPARISON OF RECENT BATTLE SHIP DESIGNS.

make a wide water line belt over the whole length of the vessel. The thickness of the armor employed for this upper belt is uniformly 6 inches, except in the case of the "Duncan," in which the water line belt and upper belt are continuous and 7-inch armor is employed.

GUN PROTECTION.

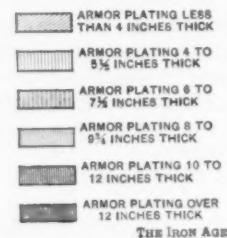
In the character and extent of the protection to the guns of first caliber the greatest range is noticeable. The lower limit of such protection is found in the "Vittorio Emanuele," where 8-inch armor is employed, and restricted armored tubes with walls of equal thickness for protection to the ammunition supply. From this the degree of protection ranges upward, as may be readily observed from the figures in Plate 1, the maximum being found in the "Mikasa," in which there are barbettes 14 inches in thickness extending at their full diameter to the top of the water line belt.

The protection adopted for the guns of second caliber is uniformly 6-inch armor throughout all the designs under consideration. The method of disposing this armor for the protection of the guns varies. In three of the six ships there are central batteries, concentrated in

designed speed is 19 knots. In the "Vittorio Emanuele" the speed feature is developed to an extent which separates this vessel widely from the others under consideration. Her speed of 22 knots, if realizable, would practically place her on an equal footing, as to speed, with the armored cruisers being constructed by several of the naval powers. There seems reason to doubt the accuracy of report as to the speed feature of this vessel, regard being given to the other features proposed.

The lower limit in the coal supply in the designed condition is found in the "Wittelsbach," the design for which provides for a normal supply of 650 tons, with a maximum stowage capacity of 1250 tons. From this the normal coal supply ranges through 900 tons for the "Borodino," "Virginia" and "Duncan," 1000 tons for "Vittorio Emanuele," to a maximum for this element of 1400 tons in the "Mikasa."

The variations which have been pointed out make direct comparison of the several vessels difficult. To establish a basis for the present comparison it is proposed to assume a vessel whose dimensions are those of the largest vessel under consideration, in which the features of armament, protection, speed and coal supply



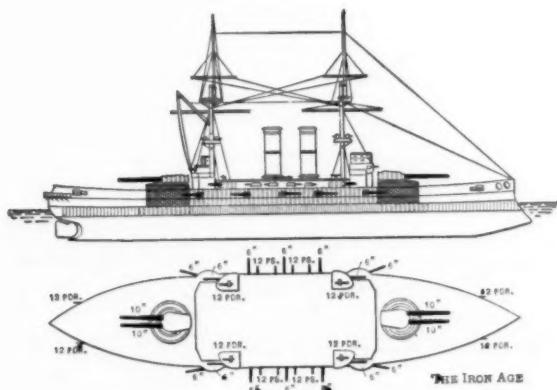
embodied are the minima of these several features which may be found among the designs under discussion. Such a vessel would represent the extreme lower limit to which, as judged from current practice, it is thought possible to reduce the several elements, and will be designated a type design.

The Type Design.

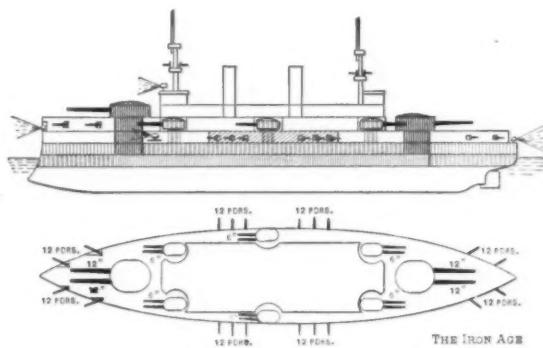
This type design will then be a vessel of about 435 feet in length and 76 feet in breadth (about the extreme dimensions of the "Virginia" class), having a speed of 18 knots (the speed of the "Mikasa" and "Borodino"); with a normal coal supply of 650 tons (that of the "Wittelsbach"); a battery of four 9.4-inch guns (the first caliber battery of the "Wittelsbach"), and 12 6-inch guns, 12 12-pounder and six 3-pounder guns (the second caliber guns and secondary battery of the "Duncan"); two torpedo tubes (as in the "Virginia"); a water line belt 7 inches thick and 7 feet wide, extending from the after barbette for two-thirds of the length of the vessel, with 2-inch nickel steel plating carried from the forward end of this belt to the stem (the water line protection of the "Duncan"); surmounted by a shorter belt 6 inches in thickness, inclosed by bulkheads at its ends of the same thickness, extending up to the top of the gun deck to form a protected battery (as on the "Wittelsbach");

terry carried; the protection given to stability, armament, ammunition supply and personnel; the speed; and the time during which she may operate without interruption, as measured by her coal supply. Her naval value, therefore, is independent of her displacement, although there is a relation between that naval value and displacement which fixes the limit of naval value which may be reached upon any displacement, and the excellence of any design should be judged by the nearness of the approach of that design to this limiting relation.

Such a vessel as the type design outlined above has, for naval purposes, a definite value, which might be expressed in a variety of ways. Each of the several vessels whose designs it is proposed to compare may be regarded as being such a vessel as the type design, upon which improvements of value have been introduced in one or more of the elements of armament, protection, speed or coal supply. The designers of the several vessels under consideration, having provided for the minima of the several essential features of battle ship design, have varied the distribution of the remaining disposable weight in a manner which each individually deemed most efficient. Since each of the several features may be found developed to an extreme in some one or more of the vessels being compared, and since the one restricting and governing condition in such development is



Japan, "Mikasa," 400 Feet Long, 18 Knots, 15,200 Tons.



Russia, "Borodino," 397 Feet Long, 18 Knots, 13,600 Tons.

A BRIEF COMPARISON OF RECENT BATTLE SHIP DESIGNS.

the 9.4-inch guns and ammunition supply protected by barbettes and ammunition tubes carrying armor 8 inches in thickness (the protection of the first caliber guns of the "Vittorio Emanuele"); and the 6-inch guns and ammunition supply protected by 6-inch armor (the protection of the second caliber guns provided in all of the designs under consideration). It has been necessary to assume that the protective decks in the several designs under consideration are of practically equal value as protection, and that the type design has an equivalent protective deck. A sketch outline of the elevation and deck plan of this type design is shown in the first drawing.

To attempt to express in figures an absolute or relative naval value, even for vessels of the same class, is generally regarded as almost impracticable, because of the impossibility of suitably assigning values among the several design elements, all contributing to a successful whole and differing so widely in their individual purposes as to be practically incomparable. Since, however, such an expression of value, even if only very approximately correct, affords a means of giving point to a comparison, an effort will be made to reduce the present comparison to such terms as will permit the assignment of approximate relative values. The results, depending as they do upon so many things which, at best, can be but inaccurately known to any but the designer of each vessel, must, of course, be regarded as qualified by the inaccuracies in the data upon which such results depend.

Naval Value.

It may fairly be assumed that the naval value of any vessel at any given period depends chiefly upon the bat-

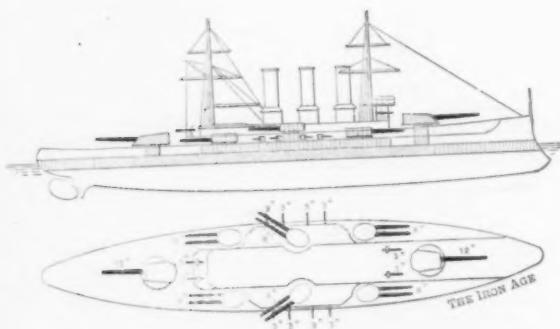
weight, may it not fairly be assumed that the naval value assignable to the excessive development of any one of the design features may be represented by the weight necessary to such a development in any degree above that represented by a minimum embodied in all the designs? Such an assumption will here be made; and the naval value of the type design will be assumed to be 4300, the approximate weight required, under the conditions outlined, to provide in the type design the features embodied. The relative naval value of each vessel under consideration, as compared with the type design, will be expressed finally by adding to 4300, the naval value of the type design, the weight which it would be necessary to add to the type design in order to provide in that vessel for the armament, armor, speed and coal carried in the design whose relative naval value it is desired to represent.

The several vessels, when compared with the type design, show increases in the several naval features, with corresponding added naval value, as follows:

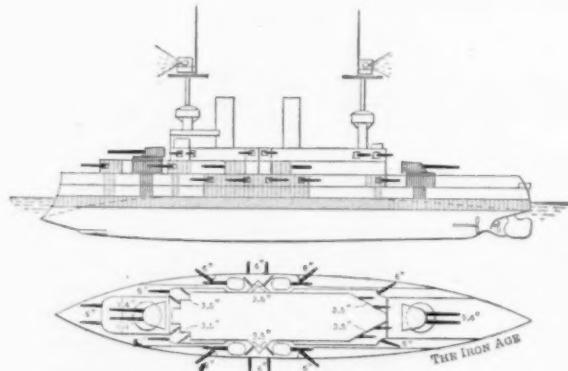
"Virginia."

	Tons.
Four 12-inch guns instead of four 9.4-inch guns.....	Value 160
Eight 8-inch guns additional.....	" 350
Twelve 14-pounders instead of 12 12-pounders, and two 3-pounders and eight 1-pounders additional.....	" 40
Heavier and more extended water line protection (11- inch armor as compared with 7-inch armor amid- ship)	" 410
More extended upper belt.....	" 120
Heavy guns in turrets protected by 10-inch armor; large diameter barbettes with 10-inch armor.....	" 620
Protection of 8-inch gun positions, and extended cen- tral battery protection.....	" 240
Protection to portion of secondary battery.....	" 40

Additional normal coal supply.....	Value 250	Additional protection to heavy guns (10-inch armor as compared with 8-inch armor).....	Value 80
One knot more speed, which, with weights added above, necessitates increase in machinery weights.....	" 520	Armored casemate for two additional 6-inch guns and turrets for four additional 6-inch guns.....	" 240
Total additional value.....	2,750	One knot more speed, which, with weights added above, necessitates increase in machinery weights.....	" 330
Value of type design.....	4,300	Total additional value.....	960
Relative naval value.....	7,050	Value of type design.....	4,300
"Duncan."			
Four 12-inch guns instead of four 9.4-inch guns.....	Value 160	Relative naval value.....	5,260
Two additional submerged torpedo tubes.....	" 20	"Vittorio Emanuele."	
More extended upper belt of greater thickness.....	" 350	Two 12-inch guns instead of four 9.4-inch guns.....	Value 50
Heavy guns mounted on turntables with barbettes protected by 11-inch armor.....	" 500	Twelve 8-inch guns instead of 12 6-inch guns.....	" 220
All second caliber guns in isolated armored casemates, affording additional protection to such guns.....	" 260	Twelve 14-pounders instead of 12 12-pounders, and six additional 3-pounders.....	" 20
Additional normal coal supply.....	" 250	Additional torpedo outfit.....	" 30
One knot more speed, which, with the weights added above, necessitates increase in machinery weights..	" 450	Heavier and more extended water line protection (9½-inch armor as compared with 7-inch armor amidship)	" 270
Total additional value.....	2,000	More extended upper belt.....	" 80
Value of type design.....	4,300	Protection to second-caliber guns by turrets.....	" 160
Relative naval value.....	6,300	Additional normal coal supply.....	" 350
"Borodino."			
Four 12-inch guns instead of four 9.4-inch guns.....	Value 160	Four knots more speed, which, with weights added above, necessitate increase in machinery weights..	" 1,500
Eight additional 12-pounders and 14 additional 3-pounders	" 50	Total additional value.....	2,260
Four additional above water torpedo tubes.....	" 80	Value of type design.....	4,300
Heavier and more extended water line protection (9-inch armor as compared with 7-inch armor amidship)	" 100	Relative naval value.....	6,560
More extended upper belt, complete.....	" 200	In Table II the several vessels will be found in the order of their relative values, and the values assigned to each of the several items are given in such a manner as	



Italy, "Vittorio Emanuele," 435 Feet Long, 22 Knots, 12,625 Tons.



Germany, "Wittelsbach," 418 Feet Long, 19 Knots, 11,800 Tons.

A BRIEF COMPARISON OF RECENT BATTLE SHIP DESIGNS.

Heavy guns in turrets protected by 10-inch armor with large armored tubes.....	Value 450
Protection to portion of secondary battery.....	" 120
Additional normal coal supply.....	" 250
With same speed, weights added necessitate increase in machinery weights.....	" 130
Total additional value.....	1,490
Value of type design.....	4,300
Relative naval value.....	5,790

"Mikasa."

Four 10-inch guns instead of four 9.4-inch guns.....	Value 50
Two additional 6-inch guns.....	" 50
Eight additional 12-pounders, two additional 3-pounders, and four additional 2½-pounders.....	" 20
Two additional submerged torpedo tubes.....	" 20
Heavier and more extended water line protection (9-inch armor as compared with 7-inch armor amidship)	" 350
More extended upper belt.....	" 190
Heavy guns mounted on protected turntables, with large diameter barbettes protected by 14-inch armor.	" 580
More extended central battery and protection to two additional 6-inch guns.....	" 190
Additional normal coal supply.....	" 750
With same speed, weights added above necessitate increase in machinery weights.....	" 230
Total additional value.....	2,430
Value of type design.....	4,300
Relative naval value.....	6,730

"Wittelsbach."

Six additional 6-inch guns.....	Value 145
15-pounders instead of 12-pounders.....	" 10
Additional torpedo outfit.....	" 25
Heavier and more extended water line protection (8.8-inch armor as compared with 7-inch armor amidship)	" 130

to facilitate direct comparison of the distribution of weight among the several features.

It should be noticed that there is reason to believe that the figures for the indicated horse-power and displacement for the Italian vessel, "Vittorio Emanuele," are inaccurate, since, in the present state of shipbuilding art, it would seem to be impracticable to procure, with the horse-power given, the designed speed of 22 knots in a vessel of the designed displacement of 12,624 tons; and this displacement would seem to be inconsistent with the features which, if report relative to this vessel be true, it is proposed to embody in the design. It should also be noticed that the feature of protection given by the protective decks of the several vessels is regarded as being of equal efficiency and value in all the vessels. It is known that in the "Borodino" this protective feature has been developed to an extent somewhat in excess of that found in the other vessels compared; and, had it been practicable to extend the comparison to include this feature, the "Borodino" would doubtless have shown to better advantage in the final results.

Since the relative naval values given above are expressed in terms of, mathematically, the same dimensions as those employed in the expression of displacement—if the relative naval values be divided by the designed displacements of the several vessels the results may be expressed as a percentage, which might be termed the efficiencies of the several designs. These figures are given in the last line of Table II, and varying, as will be seen, from 42.7 per cent. for the "Borodino" up to 52 per cent. in the "Vittorio Emanuele" (assuming the de-

signed displacement given for this vessel to be a possible one); and the order of merit of the designs would be, on this basis, as follows:

- "Vittorio Emanuele," 52.0.
- "Virginia," 47.2.
- "Duncan," 45.0.
- "Wittelsbach," 44.6.
- "Mikasa," 44.3.
- "Borodino," 42.7.

In conclusion, it may be stated that while reasonable care has been given to the estimates upon which they are based, detailed accuracy in the figures given above is not

The Federal Industrial Commission.

WASHINGTON, D. C., December 17, 1901.—The bill providing for the extension of the term of the Federal Industrial Commission from December 15, 1901, to February 15, 1902, was passed by the House of Representatives on the 13th instant, and having already been favorably acted upon the Senate, it was promptly approved by the President just 24 hours before the Commission would otherwise have expired by statutory limitation. The narrow escape from premature extinction was emphasized by the fact that it became necessary

Table II.—Relative, Additional and Total Values.

	"Virginia."		"Mikasa."		"Vittorio Emanuele."		"Duncan."		"Borodino."		"Wittelsbach."	
	Added value.	Totals.	Added value.	Totals.	Added value.	Totals.	Added value.	Totals.	Added value.	Totals.	Added value.	Totals.
Heavy guns and ammunition	160	....	50	....	220	....	30	....	50	....	145	....
Second caliber guns and ammunition	350	....	50	....	220	....	30	....	30	....	25	....
Secondary battery guns and ammunition	40	....	20	....	20	....	30	....	50	....	10	....
Torpedo outfit	....	550	....	140	30	....	220	....	190	....	240	....
Total amount	....	550	....	140	....	220	....	190	....	240	....	180
Water line protection	410	....	350	....	270	....	350	....	100	....	130	....
Upper belt and bulkheads	120	....	190	....	80	....	350	....	200	....	....	....
Protection to heavy guns	620	....	580	....	....	....	500	....	450	....	80	....
Protection to second caliber guns	240	....	190	....	160	....	260	....	120	....	240	....
Protection to secondary battery	40	....	....	....	....	....	....	....	....	....	....	....
Total protection	1,430	....	1,310	....	190	....	1,110	....	870	....	450	....
Coal supply	250	....	750	....	350	....	250	....	250	....	....	....
Speed	520	....	230	....	1,500	....	450	....	130	....	330	....
Total additional value	2,750	....	2,430	....	2,260	....	2,000	....	1,490	....	960	....
Value of type design	4,300	....	4,300	....	4,300	....	4,300	....	4,300	....	4,300	....
Relative naval value	7,050	....	6,730	....	6,560	....	6,300	....	5,790	....	5,260	....
Designed displacement	14,950	....	15,200	....	12,624	....	14,000	....	13,600	....	11,800	....
Efficiency of design	47.2	....	44.3	....	52.0	....	45.0	....	42.7	....	44.6	....

claimed. The purpose has been to roughly estimate and express in concrete terms the relative naval values of the several vessels whose designs were considered, in order that the results of this comparison might be presented in a form more tangible than that of a general discussion of the several features of the designs.

The London Underground Electrical Equipment.

Charles Yerkes has awarded a very large electrical contract for the London Underground Railway to the British Westinghouse Electrical & Mfg. Company, Limited, whose new works at Manchester, England, will start up in a few weeks. The electrical generators will be as large as those for the Manhattan Elevated Railway in New York, which are at present the largest in the world. The famous Westinghouse generators at Niagara are 5000 horse-power each; the Manhattan machines are 6650 horse-power each, and those for Mr. Yerkes' London enterprise will be 6660 horse-power each. The latter will be driven by turbine engines. No steam turbines a third as large have ever been built or planned till now. To give an idea of the new electric generators for Mr. Yerkes' London railways some facts may be recalled about the Westinghouse machines of similar power for the New York elevated. These latter weigh 900,000 pounds each, are 42 feet high, and one of them will give out energy equal to that of 500,000 men. Mr. Yerkes' electric generating station in London will have a minimum capacity of 70,000 horse-power, and a maximum of 100,000. The work will begin immediately, and within two years from January 1 the steam tunnels which penetrate London in all directions will be whitened and ventilated and served by an up to date system of electric trains. It is an interesting fact that for the underground as well as the elevated railways of the three largest cities in the world, London, Paris and New York, the electric machinery is designed and produced by the Westinghouse interests.

The Census Bureau has issued a bulletin giving the statistics of manufacturing and mechanical industries for West Virginia, which shows a capital of \$55,719,938 invested in 4415 establishments. The value of the products was returned at \$74,177,681, to produce which involved an outlay of \$1,563,097 for salaries of officials, \$12,876,902 for wages, \$3,933,514 for miscellaneous expenses and \$42,632,813 for materials used.

for both the Vice-President *pro tempore* and the Speaker of the House to suspend the joint rules of Congress in order to affix their signatures to the measure, as the regulations require that measures shall not be signed except when both Houses are in session, and in this case both the House and the Senate had adjourned for three days when the extension bill was enrolled.

In the debate precipitated by the request for unanimous consent to pass the extension bill several significant statements were made, indicating a great diversity of opinion as to the usefulness of the Commission. Senator Cockrell, the ranking Democratic member of the Appropriations Committee, at first objected to the passage of the bill, declaring that the Commission had already been granted an extension and insisting it should conclude its work at once. Senator Hale gave it as his opinion that the Commission ought not to be permitted to renew its investigations, which would probably lead to a call for more time, but Senator Penrose, who is also a member of the Commission, declared that the only purpose of the extension was to complete the compilation of evidence and the final report to Congress, and upon this statement the bill was passed.

In the House there was considerable discussion of the extension proposition. Representative Richardson, the minority leader, suggested that the Commission had some unexplained reason for desiring an extension, but Representative Livingston, who is also a member of the Commission, declared that the real necessity of the extension was to enable five Senators and as many Representatives, who were members of the Commission, but who had not attended its hearings, to familiarize themselves with the testimony taken before voting upon the final report. "The extension, therefore," he said, "was more an accommodation to Congress than to the Commission." "It is true," he added, "that the final report cannot be prepared within the date of the limitation of this Commission, but if the report were ready to-day to be signed, there are not over two members of Congress appointed on that Commission prepared to sign it." Representative Robinson of Indiana stated that he understood that the Commission had experienced difficulty in securing witnesses connected with the leading industrial combinations for the reason that they refused to testify, but Mr. Livingston promptly denied that this was the case. Several other members of the House suggested that the appointment of members of Congress on the Commission was a mistake, and Representative

Gaines of Tennessee, the author of several trust bills, declared that although members of Congress had accepted appointments on the Commission and had not resigned, they had neglected their duty. The bill was then passed with the distinct understanding that the work of the Commission during the next two months shall be limited in accordance with a memorandum prepared by Chairman Clarke of the Commission and submitted to the House, as follows:

"The mass of material presented by this Commission would be largely inaccessible if published, as is so often the case with Government reports, without adequate summaries, tables of contents and indexes. The Commission has made a special point of rendering all of its publications easily usable by the busy man. Each volume of testimony contains a condensed review, a more detailed digest and a thorough index. The preparation of some of these reviews was necessarily delayed until after the closing of the testimony, and the revision of them by the Commission has consumed a considerable amount of time up to a recent date.

"The Commission has bent every effort to the completion of its work within the time limited by law, and is able to report that all of the volume, except that containing its conclusions and recommendations, will be ready to submit to Congress before December 15. It has been found impossible, however, to complete the final volume. It is the aim to present in this volume, in thorough but concise form, the essential facts elicited in all of the Commission's investigations. The volume must necessarily be of considerable size and must cover many topics, as may be seen by the preliminary outline. The final report will probably contain from 700 to 1000 pages. On the basis of the facts thus epitomized the Commission will draw up its conclusions and suggestions for legislation.

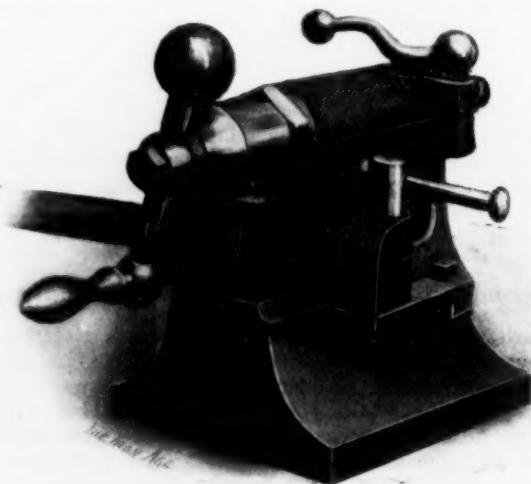
"Obviously the preparation of such a report requires great care and thorough discussion. The relatively large membership of the Commission makes it the more difficult to reach a general consensus as to conclusions and desirable legislation, while at the same time rendering more valuable the result ultimately reached. The Commission would doubtless find itself fairly able to complete the review of facts by December 15, but to agree upon the conclusions and recommendations within that time is practically out of the question.

"The Commission has already virtually completed its review of facts and statements of conclusions regarding the subjects of transportation, trusts, agriculture, immigration and mining, and has made considerable progress in the direction of proposed recommendations on these topics. The difficulty of the problems involved, however, calls for careful and prolonged deliberation. The Commission has been unable as yet to do more than prepare a preliminary draft for the final report regarding the important topics of manufactures and general business, labor problems and taxation. To complete the report on these topics and to draw up recommendations for needed legislation regarding them will require not less than two months' additional time. The various parts of the final report can, if desired, be submitted to Congress from time to time as completed."

As the extension bill was not passed until the closing hours of the Commission's term, an emergency draft of a report on the trusts had already been prepared with a view to rushing it into Congress at the last moment should the extension be denied. This report was necessarily limited in the matter of recommendations for legislation to such provisions as a majority of the Commission had already been induced to approve. These suggestions may be summed up in a single recommendation for increased publicity with regard to the operations of industrial combinations. It was proposed that Congress should provide for the levying of a small graduated tax upon all corporations doing an interstate business, which tax was designed solely to provide authority for a measure of Governmental supervision. Each corporation was required to make returns annually, and at irregular intervals if called upon to do so, with such information as might be demanded, either by the Secretary of the Treasury or such other officer as Congress

might select. These returns, it was proposed, should present whatever data might be considered necessary to demonstrate the financial condition of the corporation and also to enable the supervising official to determine the amount of the corporation's interstate business upon which the tax referred to would be based. The amount of the tax was not suggested, but it was recommended that it should be nominal and graduated in proportion to the total output going into interstate commerce. The supervising official, it was proposed, would be authorized at any time to inspect the books of any corporation with the view to ascertaining whether the law had been fully complied with and a faithful return made as the basis for taxation.

The recommendation for the enactment of a Federal charter law, which has been under consideration by the Commission for some time, was abandoned so far as the emergency report was concerned, for the reason that it was found to be impossible to secure for it the ten votes necessary to its adoption. It was generally conceded that such a law in order to be effective would require to be mandatory, and a number of the commissioners were in doubt as to whether a mandatory statute, virtually depriving the States of a measure of control over corporations now chartered by them, would be constitutional. It was argued that if a Federal charter law should be made permissive only, and dependent upon a low rate of taxation to induce corporations to accept Federal supervision, a very important class of industrial combinations would prefer to escape such supervision



THE FAIRBANKS LATHE TAIL STOCK.

even at the expense of a very heavy State tax, and the proposed legislation would, therefore, result in a species of discrimination that could not be tolerated.

The extension bill having passed, the emergency report on the trusts will be laid on the table, so to speak, and an effort will be made to induce a majority of the Commission to adopt some more radical recommendations. The friends of a mandatory Federal charter law are very active and hope to bring enough of their colleagues to their way of thinking to secure a favorable report on that proposition. At the same time there is no indication of success in this direction, and no prediction can be made as to the outcome. It is not likely that the Commission will exhaust the two months' extension before submitting to Congress its report on the trusts, but considerable time will be utilized in an effort to secure an agreement on a more comprehensive basis than that of the emergency report. As Congress will adjourn for the holiday recess on the 19th inst. and will not reconvene until January 6, no opportunity will be afforded in the meantime for the presentation of a report, but it is likely that the Commission's last word on the subject of the trusts will be laid before Congress on or before February 1. The other subjects referred to in Chairman Clarke's memorandum will be reported upon from time to time.

W. L. C.

The Indiana Iron & Rail Company have started a scrap iron yard at Terre Haute, Ind., near the new plant

of the Highland Iron & Steel Company. The concern are handling nothing but scrap, with a considerable force of men, having track room in the yard for 14 cars. The proprietors of the concern are: H. V. Finkelstein of Peoria, Ill.; Frank Finkelstein of Indianapolis, and J. R. Finkelstein of Indianapolis, who is general manager. Ike L. Finkelstein is the traveling representative.

The Fairbanks Lathe Tail Stock.

The drawings here presented show a new lathe tail stock designed and built by George L. Fairbanks of Worcester, Mass. The operating lever A is held in the casting B, which is pivoted to the tail stock at E. This casting is split and provided with a binding screw, D, in order that the operating length of the lever may be increased or decreased to suit the size of the drill used. One end of the casting is connected with the base of the tail stock by the link B B. The parts are formed with dovetail guides, which are furnished with a gib for tak-

ing up wear. The sliding portion carries the usual screw feed. As an attachment for hand lathes this device will be found very convenient. By the use of the screw feed it may be quickly adjusted as may be desired.

The Tuscora Steel Company.—The new sheet mill plant of the Tuscora Steel Company, at Newcomerstown, Ohio, will soon be completed. The firm expect to start their black and galvanized sheet mills about January 15, and the galvanizing and roofing plant about February 15. The main building containing four hot mills and the same number of cold mills is 110 x 256 feet. The galvanizing department is 50 x 120 feet, and the corrugating and roofing department 62 x 240 feet. The first two buildings are finished and most of the machinery has been installed. Edward E. Erikson of Pittsburgh is consulting engineer, and the plant was built under his supervision. The officers of the Tuscora Steel

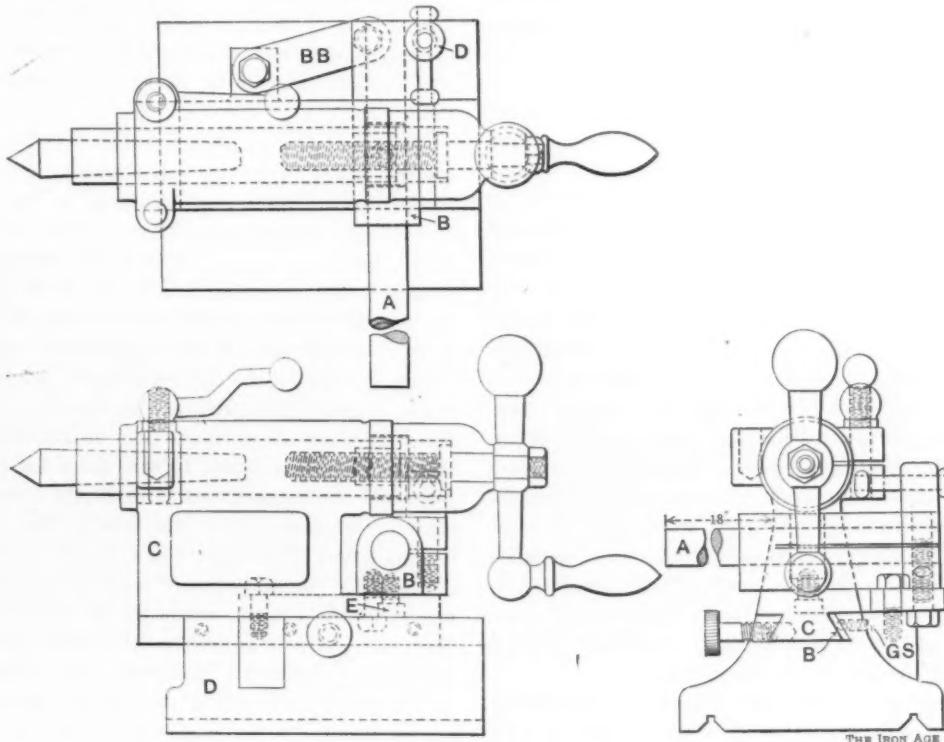


Fig. 2.—Plan and Elevations.

THE FAIRBANKS LATHE TAIL STOCK.

ing up wear. The sliding portion carries the usual screw feed. As an attachment for hand lathes this device will be found very convenient. By the use of the screw feed it may be quickly adjusted as may be desired.

The Sharon Steel Company.—The Sharon Steel Company of Sharon, Pa., will add to their present 600-ton blast furnace two additional blast furnaces, which, however, are to have a capacity of only 350 tons each. It has been determined to return to a smaller-type of furnace, so that the Mesaba ores owned by the company may be more effectively worked. The work on the Sharon Tube Company, a subsidiary concern, is being rapidly pushed. The foundations are in and the structural work is ready to put up. It is expected that the works will be in operation by June 1. The 12-mill sheet plant of the Sharon Sheet Steel Company is progressing. It is expected that it will be working on May 1. It has also been determined to add four additional open hearth furnaces to the present equipment of eight furnaces.

H. M. Shimer & Co., smelters and refiners of babbitt metal, brass and spelter, Philadelphia, Pa., have pur-

Company are Thomas Heckett, president; R. L. Shoemaker, treasurer, and A. T. Stone, secretary.

Secretary Deane of the California Petroleum Miners' Association has published a list of 126 large firms and companies in San Francisco that have adopted oil fuel in place of coal during the past two years. The list contains the names of many of the largest industrial enterprises of San Francisco, including practically all the street railways and great manufacturing plants.

The Beall Shovel Company of Alton, Ill., contemplate the building of a rolling mill to roll shovel plate in their factory from old rails and axles. They are looking into the building of a plant of three sets of 18-inch rolls, a heating furnace, heavy shears and a plate trimming shear, with a boiler to be operated by the waste gases from the heating furnace and an engine.

Marvin W. Kingsley, for 28 years superintendent of the Cleveland, Ohio, Water Works Department, has opened offices in the Rose Building, that city, and will devote his attention to civil and hydraulic engineering pertaining to the erection of water works plants, &c.

The Iron Age

New York, Thursday, December 19, 1901.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
CHARLES KIRCHHOFF,	- - - - -	EDITOR.
GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS,	- - - - -	HARDWARE EDITOR.
JOHN S. KING,	- - - - -	BUSINESS MANAGER.

The Interurban Electric Railway.

Guy Morrison Walker of Boston has published, under good banking auspices, a monograph on interurban electric railways which contains much of interest. It is undeniably true that in the expansion of the electric street railroad into a system of intercommunication between cities for the cheap and expeditious transportation of both passengers and freight we are witnessing the most remarkable and significant fact in the evolution of internal transportation.

The rapidity of this development is one of its most surprising features. It is not 15 years since the first application of electricity was made to the movement of cars on street railways. In that short interval it has displaced all forms of traction for city and suburban traction. Every town and city of sufficient importance to need lines of passenger vehicles is now traversed with electric lines, and in most of them we find an equipment conforming to high standards of technical and practical excellence. It is less than ten years since the first suburban lines were installed and successfully operated, and it is only about two years since the invention of the tri-phase system of power transmission opened the way for the construction of interurban lines and bringing the electric road into direct and successful competition with the steam railroad, which it now menaces with the loss of a large and important part of its business. Nothing could more perfectly illustrate the astounding rapidity of the development of electric traction than this brief review of its chronology.

It is perfectly natural that the electric railroad should have expanded thus rapidly from a street railroad into a system of interurban communication. Even brief experience has shown that it meets the requirements better than they ever have been or ever can be met by the locomotive drawn train running on a schedule. The practicability of substituting loops for terminals, and carrying the cars of the suburban and interurban service into the very centers of business activity, changes all the conditions established by the necessities of the steam roads for fixed terminals and inflexible time tables. The growth of the street railroad from a strictly local to a suburban service, and from that into a system of transportation between cities separated by greater or less stretches of country, admitting of development by better facilities of communication with the centers of population on either side, is as natural as the growth of the infant into the boy and the boy into the man. The effect of this development upon the steam railroads is probably the most interesting problem now engaging the attention of financiers.

The fact which first attracts notice in a study of this question is the lower capitalization of the electric road as compared with the steam road. There are many reasons why this is possible, such as the ability of the electric car to climb grades which for the locomotive drawing a train would be impossible. Mr. Walker gives some comparisons on this point which are extremely in-

structive. For example: The Detroit & Port Huron Electric Railway, running from Detroit through a number of small towns to Port Huron, a distance of 72 miles, is capitalized at only \$34,480 per mile, while the Grand Trunk Railroad, with which it competes, is capitalized for \$93,714 per mile. The Toledo, Fremont & Norwalk Railroad, an electric line 62 miles long in Ohio, is capitalized for \$40,000 per mile, while the Lake Shore & Michigan Southern, with which it competes, is capitalized for \$70,000 per mile. The Southwest Missouri Electric Railway, running from Carthage through Joplin to Galena, Kan., a distance of 41 miles, is capitalized at \$31,700 per mile, while the St. Louis & San Francisco Railroad, with which it competes, is capitalized at \$56,100 per mile. These are typical figures. The average capitalization of the steam railroads of the United States, according to the report of the Interstate Commission for 1900, was \$61,490 per mile, while the average capitalization of the electric interurban railroads was a little less than \$35,000 per mile. In the cases compared the equipment was complete in each instance, and covered everything necessary to successful operation.

In a comparison of the earnings of the interurban electric roads with the steam roads with which they compete a difficulty is encountered in the fact that the sources of revenue are different. The steam railroads derive but a small part of their net earnings from passenger traffic, whereas this is the main dependence of the electric roads. In the case of the steam roads the most profitable part of their passenger business is that which is ticketed for long distances, while the electric roads derive their principal revenues from the small fares paid for short rides. The steam railroads would starve to death on 5 and 10 cent fares for short distance rides and could not afford to maintain a service for this class of business, but in the case of the electric roads it pays better than any other class of business thus far developed. The statistics of earnings show that the net return to the electric roads in the business for which they now compete is nearly three times as profitable to them as to the steam railroads. The average earnings of the steam railroads of the United States from passenger traffic for the past year amounted to \$1674 per mile, while that of the electric railways was about \$3800 per mile. In some instances the earnings of the interurban roads were much higher than this, as, for example, those of the Southwest Missouri, \$4735 per mile; of the Union Traction Company of Indiana, \$4984 per mile, and the Northern Ohio Traction Company, \$5520 per mile. An important advantage enjoyed by the interurban electric lines is that their earnings are less sensitive to general business conditions than are those of the steam railroads. People can deny themselves the costly luxury of long journeys when times are bad and money scarce, but such conditions do not affect the necessity for moving back and forth between their homes and their places of business, nor of making such short journeys as their business and pleasure demand within the sphere of their daily lives. The average fare per mile charged on the steam railroads of the United States last year was 2.003 cents; that on the electric roads doing an interurban business was 1.3 cents. For the electric roads this average was undoubtedly materially raised by the fact that a large proportion of the fares were paid on the street car basis of a uniform charge for journeys within given points. It makes no difference to the man who pays 5 cents fare whether he goes 1 mile or 5, so long as he goes as far as he wants to. In the case of steam railroads, however, the average of

2.003 cents represented full miles in every instance, and was mostly the mileage rate for long distance journeys.

As instances of the destructive influence of electrical competition with steam railroads for passenger business, Mr. Walker cites the following instances:

The Michigan Central found that from its trains bound for Detroit such a large proportion of the passengers left them at Ann Arbor and rode into Detroit over the electric line that it was necessary to lighten considerably the service between those cities. The reason for this is obvious, for the steam railroad fare from Ann Arbor to Detroit is \$1.20, while the electric line fare is only 50 cents, so that passengers leaving the steam road at Ann Arbor and continuing to Detroit by the electric line make a saving of 70 cents. The Big Four Railroad, running from Muncie, Ind., through Anderson to Indianapolis, had the same experience in connection with the Union Traction Company, and at one time almost entirely discontinued its suburban service between those cities, but it is now undertaking to regain the traffic in competition with the electric line. The contest will be interesting and instructive, but it can hardly be expected to be successful, because while it is possible that with such traffic the steam roads may be able to compete with the electric lines in the matter of rates, it is utterly impossible for them to meet the frequent service offered by the interurban lines. Instances of this kind might be multiplied, as in the case of the St. Louis & San Francisco Railway and the Missouri Pacific Railway in their competition with the South West Missouri Electric line between Carthage and Joplin, or of the Lake Shore & Michigan Southern with the Toledo, Fremont & Norwalk line in Ohio, but the results have all been the same. In the last case above mentioned the fare charged by the steam railroad between the termini of the electric line is \$1.60, while the fare over the interurban line is only 90 cents. The Flint & Pere Marquette Railroad found that so many passengers left its trains at Northville to ride on into Detroit, over the Detroit & Northwestern Electric road, that its own cars ran into the city nearly empty. In order to stop this loss of traffic, it cut Northville out of its schedules, and ran its trains through the town without stopping. The result, however, was not what the steam road anticipated, for the community, forced to rely on the electric lines for its passenger service, transferred its freight business to it also and found the service so satisfactory that all efforts of the steam road to regain the traffic have been unavailing.

The natural expedient in meeting competition of this character is to reduce rates. This the steam railroads are not likely to do, since it would render their passenger business ruinously unprofitable. Besides, the electric roads are not carrying passengers as cheaply as they could if the necessity for reducing fares existed. As the rule, they are not yet managed as scientifically as are the steam roads in the light of their 70 years' experience. Notwithstanding the obvious extravagance of much of the electric management, a comparison of operating expenses makes a very bad showing for the steam roads. The average cost of operating the steam roads of the United States in 1900 was reported by the Interstate Commerce Commission as 64.9 per cent. of gross earnings. In the same year the average cost of operating interurban electric lines was 54 per cent. of gross earnings. It cannot be doubted that the development of the science of electrical transportation will rapidly change this relation. It is already doing so in specific instances. For example, the Union Traction Company of Indiana operate their lines for 51.9 per cent. of gross earnings, while the steam road which they parallel for its entire length costs to operate 69.9 per cent. of gross earnings. The Southwestern Missouri Electric Railway is operated for 58.2 per cent., while the steam road which runs alongside of it costs 69.9 per cent. The Lorain & Cleveland was last year operated for 45 per cent., while its steam competitors, the Nickel Plate and the Lake Shore, cost 78 and 64.4 per cent., respectively.

But the field of usefulness of the electric railroads is not restricted to the carrying of passengers. They are beginning to develop a freight business which is important, and which it will seriously hurt the steam railroads to lose. They can handle this class of traffic relatively more cheaply than they can passengers and are doing so. One interurban electric road finds that its freight and express collections are earned at a cost for operating expenses of 20 per cent. of gross receipts. Two other roads of this class show a large and increas-

ing freight business done at a cost in operating expenses of 21 per cent. of gross receipts therefrom. In no instance of which the facts are accessible does the cost of handling, transporting and delivering freight amount to as large a percentage of gross receipts as in the case of the Northern Pacific Railroad, whose average of 48 per cent. of operating expenses has been the marvel of railroad men for years. The reports of four electric roads, of freight and express business, make the following showing:

Gross earnings per car mile.....	53.2 cents.
Cost of operation per car mile.....	14.2 cents.
Net earnings per car mile.....	39.0 cents.

The net earnings of these same four roads from passenger service were only 12.2 cents per car mile. What these figures suggest it would perhaps take too long to tell, but for those who are able to interpret them they are full of significance. That it is not an accident of temporary local conditions is evidenced by the fact that to accommodate the traffic between Liverpool and Manchester, now handled by three well equipped and well established steam railroads, an electric interurban railroad has just been authorized by Parliament. It looks very much as if the day of the locomotive was passing.

The Foundry Labor Situation at Chicago.

Attention has been drawn to the general situation in the foundry trade with regard to labor by the publication of a review of the events of the year in the *Iron Molders' Journal* for December. The account which is given of the various conflicts over wages presents details which are particularly interesting to certain localities. The principal difficulty of the year between molders and their employers was in Chicago. The facts are duly set forth relating to this struggle, but the status of affairs resulting from it seems to need an additional statement.

The Chicago molders, through their local unions, demanded an advance of 25 cents per day in the minimum of the floor molders and 50 cents a day of the bench molders, thus establishing a straight minimum of \$3 per day. They refused a compromise of \$2.75 per day for both bench and floor molders, offered by the Chicago foundrymen. The Executive Board of the Iron Molders' Union of North America met to consider the situation, and in view of the circumstances prevailing in other points of the country decided that it was not wise to join issue on the extreme demands of their Chicago local members. They held a conference with representatives of the National Founders' Association and agreed on a rate of \$2.85 minimum to floor molders and \$2.65 to bench molders, with the understanding that the same advance would be given in other centers where wage demands were pending. The Chicago molders, however, refused to accept the proposition made, and on July 5 inaugurated the strike which has now become a matter of some importance in the annals of the foundry trade.

It will be recalled that shortly after the strike began quite a number of the Chicago foundrymen who had a great deal of business in their shops compromised with their molders and resumed operations. It was understood at the time that most of these employers had made an agreement with their men to abide by the result of the contest which it was known would be conducted by the National Founders' Association in shops controlled by their members. The striking molders were refused the support of their international officers, who endeavored in every way to carry out in good faith their agreement with the National Founders' Association. This rendered the struggle somewhat easier to overcome by the

National Founders' Association than if they had had arrayed against them the full strength of the Iron Molders' Union. Every effort was made by the local molders to prevent any of the shops from starting up with workmen at a less rate of wages than they had adopted as a minimum. Union and nonunion molders were engaged in other localities and taken to Chicago, and, although the struggle was bitterly contested, the National Founders' Association succeeded in opening shop after shop with a full force of men free from the control of the local unions. The contest finally narrowed to a very few shops in which a supreme effort was made by the striking molders to carry their point. Within the past month the strike has been overcome even in these foundries, and it may now be said that the Chicago molders' strike is a matter wholly of the past.

The situation as it now presents itself is peculiar. The local unions are in control of a few of the foundries, and are receiving the full wages for which they contended. In other shops a compromise rate is ruling, and in the foundries controlled by the members of the National Founders' Association such wages are paid as have been found satisfactory to the individual molders employed. It is thus apparent that no uniformity of wages exists in the Chicago foundries. It is stated that the foundries paying the highest rate of wages are those who made the conditional concessions to their men. It will be seen that from the manner in which the strike was gradually overcome no formal agreement has been made between the National Founders' Association and any organization representing the molders, so that no official basis exists which can be accepted by outside foundrymen and their molders to enable the former to secure the lower rates ruling in the shops of their competitors. What the outcome of this condition of affairs will be remains to be seen. It hardly seems likely that it will be permitted to become a condition of permanence.

Another important result of this controversy has been the serious weakening of the Chicago molders' unions. They have suffered great losses in membership, and have also practically destroyed their prestige by losing control of the shops operated by the National Founders' Association. This result will probably be an object lesson to local unions in every part of the country who endeavor to set up a course of action for themselves and defy the authority of their international officers to settle for them questions under dispute.

The Copper Situation.

Procrastination has been so long the policy exercised by the copper combination that the surgical operation—the cutting of the price of copper $1\frac{1}{4}$ cents per pound—performed last week, and so long demanded by the exigencies of the case, has been robbed, to some extent, of the efficacy that would have followed prompt action when the disease of overproduction, or underconsumption, was first manifested by local congestion.

To bring about a healthful condition in the copper market, indeed, several succeeding cuts seem to be demanded. G. M. B. copper has sold in London at £50, to which must be added about 1 cent for refining and about $\frac{1}{2}$ cent for freight per pound, which is equivalent to close to 12 cents, delivered, New York, for electrolytic. Under the circumstances, to attempt to sustain copper at 15 cents here and compete with the foreign produced metal is almost as foolhardy as a factitious "official" price of $16\frac{1}{2}$ cents.

Developments in the copper trade last week seem to have substantiated the current rumors of previous large

sales at substantial reductions by the Amalgamated, but with the prospect of further declines in the price of the metal in the near future consumers will naturally restrict purchases of spot copper to the pressing needs of current requirements.

Only when the London and New York markets are more nearly on a parity, and when reliable statistics of stocks and production are made public, can the outraged confidence of the metal trade be restored and the industry return to health, from which it has been divorced by mismanagement.

The one thing to be thankful for, however, is that a step has been taken in the right direction at last; the one thing to be hoped for is that further heroic measures will be taken speedily that all uncertainty may be removed and a sound basis found upon which to rebuild the shattered trade. If the industry which consumes the bulk of the metal is sound, and there is no need to doubt the assurances that it is exceptionally flourishing, there is no valid reason in sight why copper should not enjoy a period of prosperity when removed from the false position it now occupies.

Unfortunately the material copper has been haunted by the wraith that feeds upon speculation in securities, and because of this close association the reputations of the responsible management have suffered. The stock of the Amalgamated has again declined, making a new low record during the week, although no new developments, other than the cut in the price of copper, have taken place. The conviction has settled upon the stock market that because of the embarrassments of the constituent companies, legal as well as economic, the Amalgamated Company will not receive funds enough to maintain even the 6 per cent. dividend rate, and possibly may not declare any dividend at all.

The exports of copper from the United States during the week ended December 13 were 2259 tons, and since December 1 1903 tons, while imports from December 1 to December 13, inclusive, amounted to 1279 tons.

It is claimed that "overproduction" is still depressing the market at the rate of 5000 tons per month, but it seems probable that consumption will be stimulated sufficiently by lower prices—when the legitimate trade is satisfied that the bottom has been touched—to absorb the alleged "overproduction;" if not, the only remedy is reduced output, in which the independent companies must join the leading interests as affecting the vitality of the industry as a whole.

The guarantee of the price has introduced a very serious element in the situation, from the standpoint of the producer at least, so that to-day purchases of the metal are little better than options. With prices as utterly nominal as they are now, buyers will often find it a difficult matter to discover how low their guarantee does reach.

All previous records for pays at the Homestead Steel Works were broken on Saturday, December 14, when the Carnegie Steel Company paid out to the employees of the Homestead Steel Works, the Howard Axle Works and the Carrie blast furnaces over \$500,000 for two weeks' pay. More than half the men on the pay rolls at these three works are tonnage men, and their earnings were very much larger than ever before in a similar period, on account of the great records for output being made at the different Carnegie works.

The Eleanore Iron & Steel Company, Irwin, Pa., advise us that the report that they have sold their entire output of skelp to the National Tube Company for a stated period is untrue. This concern expect to have their mill running about January 1, and will turn out from 100 to 125 tons of iron skelp per day.

Proposed English Standardization of Bicycle Screws.

The report of the council of the Cycle Engineers' Institute recommends the adoption of standard threads as laid down in the following tables:

Table I.

Diameters in inches.	Threads per inch.
0.050 to 0.084.....	62
0.085 to 0.099.....	56
0.100 to 0.124.....	44
0.125 to 0.154.....	40
0.155 to 0.199.....	32
0.200 to 1.000.....	26
Above 1.000.....	24

Table II.

Dia. in	Diam. frac. decimally.	Nos. on I.W.G.	Threads per inch.	Suitable for such parts as—
0.056	17	62	right hand	Spokes.
0.064	16	62	" "	Spokes.
0.072	15	62	" "	Spokes.
0.080	14	62	" "	Spokes.
0.092	13	56	" "	Spokes.
0.104	12	44	" "	Spokes.
0.125 $\frac{1}{8}$ inch ..	40	" "	"	Small screws, as used in free wheels.
0.154 .....	..	40	" "	Chain coupling.
0.175 .....	..	32	" "	
0.1875 3-16 inch ..	..	32	" "	Chain adjusters, brake screws, &c.
0.250 $\frac{3}{16}$ inch ..	..	26	" "	Crank cotter.
0.266 .....	..	26	" "	
0.281 .....	..	26	" "	
0.3125 5-16 inch ..	..	26	" "	Front hub axles, seat and head pins, and saddle slip bolts.
0.375 $\frac{1}{2}$ inch ..	..	26	" "	Back hub axles.
0.5625 9-16 inch ..	..	20	right and left	Pedal pins.
1.000 1 inch ..	..	26	right hand	Steering column
1.290 .....	..	24	left hand	Hub lock ring
1.370 .....	..	24	right hand	Hub chain wheel.
1.4375 17-16 inches ..	..	24	left hand	Multiplet, motor or hubs with 5-16-inch balls lock ring.
1.500 $1\frac{1}{2}$ inches ..	..	24	right hand	Multiplet, motor, or hubs with 5-16-inch balls chain wheel.

The report continues: In arriving at their conclusions your council have been influenced principally by the following considerations: The general practice as shown in the returns of the various makers. The desirability of reducing the number of pitches to a minimum and avoiding the use of more than one pitch for parts of the same diameter. The fact that modern material admits of different treatment from material which was in use when earlier forms of threads were introduced. The altered methods of production of screws and screwed parts arising from the use of automatic machinery. The uniform practice in a few special cases in which standardization practically exists.

It will be noticed that the council recommends 26 threads per inch for all spindles and clip bolts, and in fact all parts between 0.200 and 1 inch. In view of the fact that a number of firms gave in their returns 24 threads for these parts, it is necessary that reasons should be advanced for recommending 26 threads. It was found that the prevailing tendency in establishing new parts was to favor finer threads, particularly on parts by which adjustments are effected. In other parts, such as ball head lock nuts and cotter pins, it was considered that the strength of the parts was more effectually retained than if the coarser pitch were adopted.

Your council recognize that the exigencies of design will call for other diameters than those set out in Table II, though the proposed pitch in relation to the diameter may always be maintained; but, to insure interchangeability of free wheel clutches and the like and certain nuts and bolts, they particularly recommend that the exact diameters of threads cited for hub ends, wheel spindles, head locking pins, crank cotter and seat lug bolts respectively, be adhered to, as being those at present more generally used.

The form of thread which your council recommend is one having a contained angle of 60 degrees, with one-sixth of the pitch taken off the top and left in at the bottom, the resulting top and bottom being rounded to a radius of one-sixth of the pitch. After considerable research among the records and tabulated data of engineering practice in this country and abroad, it is felt

that the angle suggested is being recognized as the most mechanical, and as the one for which tools and gauges can be most readily produced within commercial limits of accuracy. Practice has also proved that the recommended form is particularly suited for screwing dies and the screwing tackle generally employed in repetition work. Inasmuch as many of the threads at present in use have been developed from hand chasers, it is believed that there is a considerable deviation from the Whitworth standard form in the direction of a shallower thread as recommended by your council.

In advocating the round form at the top and bottom your council has in view the fact that the form of screwing tackle referred to above possesses an inevitable tendency to wear round, even if the tools are originally made with flat extremities. It is also desired that the present threads should not disturb the approximate interchangeability of existing parts.

The Youngstown Iron, Sheet & Tube Company.—The Youngstown Iron, Sheet & Tube Company, now erecting sheet and tube mills at Youngstown, Ohio, have taken steps in the last few days that will call for the expenditure of a large amount of money and will very materially increase the capacity of this concern. They closed last week the purchase of Alice furnace, of Pickands, Mather & Co., at Sharpsville, Pa., and contracted with Pickands, Mather & Co. for a ten years' supply of ore to run the furnace and also for a new stack to be built at Youngstown in connection with an open hearth steel plant, to have a daily capacity of 800 tons. The Youngstown Iron, Sheet & Tube Company are now negotiating for coking coal properties and will erect a large plant of ovens, probably of the beehive type, to supply their coke. The capital stock of the concern will be increased from \$2,000,000 to \$4,000,000, and it is possible \$1,000,000 of this will be in bonds. This matter will be fully decided upon at a meeting of the Board of Directors of the Youngstown Iron, Sheet & Tube Company, to be held at an early date. In Cleveland last week, George D. Wick, president of the concern, sold a large block of stock to interests connected with Pickands, Mather & Co. Mr. Wick will also recommend to the board the doubling in size of the present sheet mill, or perhaps the building of a 10-mill tin plate plant, and the erection of another large skelp mill and a pipe mill to roll up to 12 inches. The transactions already made and those under way will put the Youngstown Iron, Sheet & Tube Company in splendid condition, allowing them to make sheets and tubes from the ore up and entirely independent of the outside market. In fact, this concern will have one of the most modern plants in the country. It has very much outgrown the first plans when the company were organized.

The Pittsburgh Stove & Range Company of Pittsburgh have sold to the American Locomotive Company the property and buildings formerly owned by De Haven & Co., Limited, stove makers, and located on Preble avenue, in Allegheny. The De Haven plant was taken over when the Pittsburgh Stove & Range Company were organized about two years ago.

Witherbee, Sherman & Co. of Port Henry, N. Y., have been so successful with their new concentrating plant that it is to be doubled as soon as possible. Through careful screening the greatest part of the product is coarse, a welcome feature to furnacemen, and at the same time lowering the cost of concentration and reducing losses. It is probable that the apatite will also be utilized.

In one turn recently there was made at the Ohio Works of the National Steel Company, Youngstown, Ohio, 145 heats and 581 ingots.

The White Hickory Wagon Mfg. Company, Atlanta, Ga., would be pleased to receive catalogues from manufacturers of machinery for boring wells for oil or gas.

Notes from Mexico.

The Silver Situation.

DURANGO, MEXICO, December 12, 1901.—The recent startling rise in the price of exchange came almost like a thunder clap to the Mexican importer. It was unexpected, notwithstanding the erratic course of the money market for some months past, and the plain evidence which the situation seemed to furnish that whatever influences were at work to bear down the value of the peso, these influences were sufficiently strong to clip a fraction or two from the Mexican legal tender at each partial recovery from frequently recurring "slumps."

The problem as to what is the cause of the sudden and high rise in exchange is one which has been a fruitful theme of discussion among all classes of business men. The reasons given are many and various. They range from the allegation that the cause lies in the reported intention of the United States Government to coin a special dollar for use in the Philippines, to an asseveration that the Spanish Government's avowal of its intention to coin no more silver is the underlying reason for the shrinking of the Mexican dollar. Between these two extreme arguments, half a dozen others, more or less apocryphal, come in. Perhaps the best reflection of the situation as it has existed for some days past is given by the Mexican *Herald*, in its issue of December 8. That journal says: "Exchange began going up toward the end of last week and reached the highest point Wednesday, when the quotation closed at 132½. All sorts of evils were predicted. Merchants refused to send in further orders for imports and those who had ordered heavily for delivery this month felt queer."

Within a few days the rate dropped to 128½, which afforded some relief. In the meantime the Government, ever vigilant for the country's interests, stepped in and set in motion the wheels of legislation with the object of counteracting to some extent what is believed to be injurious speculation in the white metal, which is the basis of Mexico's currency.

A bill has been introduced in Congress by which the Executive is authorized "to remove in whole or in part the taxes established by the law of the 27th of March, 1897, on silver which, having been exported out of the Republic, is reimported for its coinage here, inside the term and with the requisites which the Executive will fix."

It is scarcely necessary to point out the hardship which the Mexican importer, merchant, and, indeed, business men of every degree, having transactions with the outside world, suffer when the rate of exchange suddenly takes to itself wings. It has a paralyzing effect upon their operations. Their foreign accounts for goods received, or ordered for immediate delivery, increase proportionately with the higher climbing of the bank rate, and with no advantage to themselves. They may, and indeed must, recoup themselves by charging up the difference to their customers, where this can be done; but it is not at all times possible. The ordinary customer does not care to pay a higher price than he has been accustomed to pay for a particular article. The explanation that the higher rate of exchange is responsible for the increase in price demanded is an explanation which frequently does not explain any more than it satisfies. The importer has no recourse but either to philosophically "grin and bear it," or to countermend his orders, when this is possible, and await the falling of the financial barometer.

Mexico as a Market for United States Manufacturers.

At a time when the attention of the people of the old and new worlds is directed to Mexico on account of the meeting of the Pan-American Congress in the country's capital, it will not be out of place to once more call the attention of American manufacturers to the great market which this republic offers for the sale and distribution of their products. The talk of a Pan-American railway which shall give the American manufacturer a direct, all-rail route to the markets of Central, and possibly of South America, should not, by the element of romance which such a large project embodies, lead him

astray. Despite the fluctuations of silver, and the tribulations which it causes the Mexican importer, Mexico is *par excellence* the American market outside of the geographical boundaries of the United States upon this hemisphere. That the fact is appreciated, though not as fully as it ought to be, the steady increase in the volume of the imports from the United States into Mexico clearly proves. Despite the criticisms sometimes heard upon the score of indifference of some American manufacturers to the requirements of the Mexican trade, American made merchandise of every class is forcing the products of all its competitors out of this market. This is due to pure merit, and not to any political catholicon in the way of a reciprocal trade treaty.

That this republic in its capacity as a consumer rises Colossus like above all the other Powers south of the Rio Grande, it is only necessary to emphasize what has before been pointed out—that the yearly value of Mexico's imports in gold is about \$62,000,000, while the value of the imports of her six nearest neighbors combined is about \$15,000,000.

J. J. D.

Enormous Orders for Locomotives.

It is asserted that the American Locomotive Company have orders for 1300 locomotives on hand, and recently the Pennsylvania Railroad has ordered 300 new engines. The locomotive builders outside the American Company have a yearly capacity of at least 1500 more, and are reported as full of business, so much so that they do not care for foreign inquiries, which still keep coming in. Assuming that these engines cost \$6000 each on an average, it will be seen that no less than \$24,000,000 worth of contracts are on hand to be delivered as soon as possible. As to capacity, a low average load is 2000 tons for each engine, consequently 6,000,000 tons are in sight somewhere to be hauled at some time daily. These brief statistics tell better than anything else could the business transactions of the United States in all lines, both present and future. Locomotives are not evoked "like spirits from the vasty deep," but must be contracted for a long time ahead. It must be borne in mind, also, that besides the new engines ordered there are at least an equal number of old ones in service, so that the 6,000,000 tons aforesaid might be multiplied by two safely when considering the freight capacity of the railways of the United States, chiefly in supplying domestic needs, for the trade of the new colonies and of foreign countries has not been developed as it will be in the future. With the passage of the Ship Subsidy bill, all the locomotives mentioned above will be needed to carry freight to the ships now building and others that will be built; possibly the conviction that the subsidy bill will become a law is the reason for the enormous activity in locomotive shops.

Acting for himself, J. W. Walker, who established the Schiffler Bridge Works in Pittsburgh, and operated it under his individual ownership for some years before it was made into a stock company, has purchased a site of 70 acres of choice manufacturing property at West Carnegie, just on the outskirts of Pittsburgh. The land is well situated for manufacturing purposes, and has ample railroad facilities, having direct connection with the Pittsburgh, Chartiers & Youghiogheny, and Chartiers Valley railroads.

The Standard Steel Car Company of Pittsburgh will apply for a charter on January 2, 1902, with a capital of \$2,000,000, all of which it is claimed has been paid in. This company propose to erect a plant in Pittsburgh for the manufacture of steel cars. J. M. Hansen, formerly chief engineer of the Pressed Steel Car Company of Pittsburgh, is one of the incorporators and will be president of the company.

The Crucible Steel Company of America of Pittsburgh are about to test the Bedford process in the manufacture of tool steel. George V. Simms of London, England, is in Pittsburgh at the present time in the interests of this process.

A Gigantic Tunnel Scheme.

Last week the Pennsylvania Railroad Company, in conjunction with the Long Island Railroad, which they control, made public the plans for building a tunnel from Jersey City to Brooklyn through New York. The scheme will be carried through by two subsidiary companies, acting as construction companies, which are now being formed. The plan proposes to tunnel the North River and Manhattan Island with two single track steel tube tunnels to a site centering at Eighth avenue and Thirty-second street. At that point a great underground passenger station three blocks long and three blocks in extreme width will be erected, and from there will be run three single track tube subways to the East River and beneath it to Long Island City, the terminus of the Long Island Railroad. The three tube subways will converge on reaching Long Island City and will approach the surface at a point one-quarter of a mile back from the river, where the railroad owns a large plot of ground. Trains will be moved through the tunnel by means of electric locomotives, and since each is to be only single track the question of proper ventilation is assured. On the Jersey side the tunnels will begin just back of the Hackensack meadows, the two reaching New York at West Thirty-first and West Thirty-second streets, respectively. It is expected that the work will cost some \$40,000,000 and be completed in three years, if there are no serious engineering difficulties.

A new system, as far as the tunnel is concerned, will be introduced on the North River section. The section through Manhattan and the East River will probably be entirely rock work, while that under the North River will be through silt.

The new construction is the invention of Charles M. Jacobs of the firm of Jacobs & Davies, consulting engineer of the Long Island Railroad. The tunnel proper will be supported on columns or piers extending down through the silt to the solid rock. In the published statements it has not been made clear why it is necessary in a material like the bed of the river to support a tunnel in this fashion. Engineers familiar with the old Hudson River tunnel and the material in which it rests have no fear of the work moving in any direction after having once been finished.

The profile map in the county clerks' office shows that at the State line in the North River the tunnels will be 45 feet below the river bed. They run downward toward the Manhattan shore, entering the island 60 feet below bottom, and 80 feet or more below high water mark. Thence, following the grade of the land, they rise until between Seventh and Eighth avenues, where the great central station will be, 45 feet from the surface, the highest point in the tunnel is reached. At Broadway the tunnels will be 55 feet below the surface, and at Fourth avenue, where the rapid transit subway is crossed, the depth will be more than 60 feet. At the East River pier line the depth will be only 30 feet. Under the rivers the tunnels will be circular, but on land will be horseshoe form in section; they will be 18 feet 6 inches in diameter on the inside.

The most remarkable feature of the undertaking will be the great central station, which will in no sense be a terminal, as most of the trains will be sent through from Jersey to Long Island, and vice versa. But it will be the great traffic center. The plans show 25 tracks in the 4½ blocks of city space, with platforms intervening. Over and above these will be a bridge 100 feet wide, running from Thirty-third to Thirty-first streets, from which stairways will lead to the platforms. It will practically be a three-decker railroad station from surface to tracks. Its dimensions will be 1500 feet extreme length by 520 feet extreme width, and it will have two miles of platform.

The directors of the Jessop Steel Company, whose plant is to be built at Washington, Pa., are William Jessop, president of Wm. Jessop & Sons, Sheffield; Herbert Hughes, secretary of the Sheffield Chamber of Commerce, also a director of the British Jessop Company;

W. F. Wagner, the general manager of the New York offices of the British company; E. L. Hand of Philadelphia, Pa.; C. N. Brady of Washington, Pa., and Sydney J. Robinson. The officers of the company will be William Jessop, president; Sydney J. Robinson, vice-president, and James Jessop, secretary and treasurer.

OBITUARY.

NOTES.

SIR JAMES LAING, the famous shipbuilder of Sunderland, England, died on December 16, at the age of 78 years. He was president of the Chamber of Shipping of the United Kingdom and a great authority on all questions of naval architecture.

A telegraphic dispatch reports that Major Henry S. Pickands, senior member of the iron firm of Pickands, Brown & Co., and well known throughout the iron trade of the country, died at the Virginia Hotel in Chicago on Tuesday, after several weeks' illness, resulting from kidney trouble. He was 65 years old.

The Penberthy Injector Company of Detroit, Mich., whose plant was destroyed recently by an explosion, have secured quarters in Detroit and are now purchasing all the available machinery in sight for fitting up their temporary quarters.

The Bullock Electric Company of Cincinnati, Ohio, who, as previously announced, are planning to enlarge their works, are shopping about for equipment for same. The new addition is to be 250 x 500 feet, and it is to be used for the manufacture of electric dynamos.

Bids will be received until January 31 for furnishing boilers and traveling crane for the two 15,000,000-gallon pumping engines in the northeast pumping station, Minneapolis, Minn. G. W. Subette, city engineer.

Proposals will be received at the office of the Drainage Commission of New Orleans until January 22 for the construction and erection of the following work, according to plans and specifications: 1, One 1000 kw. generator engine and boiler complete, in the central power station; 2, one pump at Metairie Pumping Station No. 6, with a delivery of 250 cubic feet per second, with a lift of 10 feet. R. M. Walmsley, president.

Bids submitted to the Cleveland, Ohio, Board of Control for ten water tube 250 horse-power boilers for the Kirtland Street Pumping Station were as follows: J. Vernon Campbell, \$31,394; Aultman & Taylor, \$41,998; Sterling Company, \$41,480; Babcock & Wilcox Company, \$40,970. Bids for mechanical stokers ranged from \$7500 to \$14,000. Contracts will be awarded within a few days.

Julian D'Este Company, manufacturers of Curtis engineering specialties, 25 Canal street, Boston, advise us that they have just furnished a number of gun metal (bronze) improved steam pressure regulators to the Russian Government for use on their battle ships. This is a duplicate order, as one of their ships was some time ago equipped with these devices. The company also state that they are making shipments of traps and regulators to Denmark.

J. Gilmour, Bennett Building, Nassau and Fulton streets, New York, is furnishing the foundry equipment for the Marine Engine & Machine Works, Harrison, N. J., and reports a large demand for the Second Century cupola called the Newton.

The Hazard Mfg. Company of 50 Dey street, New York, have just received an order for the galvanized steel rigging to be used on the yacht that is building at the Townsend & Downey Shipbuilding & Repair Company's yard for Emperor William of Germany. Finn & White of New York are the riggers.

MANUFACTURING.

Iron and Steel.

Arrangements are being made by the Republic Iron & Steel Company to reconstruct the machinery of their rolling mills at Springfield, Ill., with a view to putting them in operation at an early day. The citizens of Springfield have purchased a sufficient amount of preferred stock of the company to cover a considerable part of the cost of the improvements to be made.

The Crawfordsville Wire & Nail Company, Crawfordsville, Ind., are arranging for reorganization with the view of securing additional capital to enable the works to be rebuilt. It is expected that the company will continue their manufacturing operations at the old location and that they will not remove to another point, although flattering inducements have been received.

Struthers Furnace, of Struthers Furnace Company, at Struthers, Ohio, which has been idle for some time, being relined and otherwise improved, is about ready for blast and will be started up just as soon as the coke situation warrants. The relining of this furnace was done in remarkably short time, and the output of the furnace will be slightly increased. This stack is equipped with a casting machine, the product being chilled basic metal. S. A. Richards is manager of the firm.

The D. Wilcox Mfg. Company, Mechanicsburg, Pa., manufacturers of carriage hardware, gun and special forgings, are contemplating erecting a rolling mill as soon as they can secure all data relative to cost.

The Waukesha Sheet Steel Company, Waukesha, Wis., have under consideration the erection of a tin plate plant, to be run in connection with their other departments.

To accumulate a stock of ore rapidly, the Graham Iron Company of Graham, Va., advise us that they are in the market to purchase iron ore. The company have been organized to operate Graham Furnace, the Tip Top iron ore fields and the Five Oaks limestone quarries, all of which are within a radius of eight miles. They are building a railroad to the Bell Hill mine and are preparing to put the furnace in blast. The officers are F. P. Howe, president; Frank Samuel, secretary and treasurer, and Walter Graham, vice-president and general manager.

The Paterson Iron & Steel Forge Company, Paterson, N. J., whose plant was recently destroyed by fire, will rebuild as soon as possible. An examination has shown that some of the heavier machinery is not damaged beyond repair.

We are advised that the report that the Republic Iron & Steel Company would dismantle puddling mill No. 1, at Youngstown, Ohio, is incorrect. This plant may possibly be wrecked at some time in the future, but it is the intention for the present, at least, to operate it.

The Youngstown Iron Sheet & Tube Company, Youngstown, Ohio, are making new process galvanized sheets, at Niles, Ohio, in the works formerly operated by the New Process Galvanizing Company, which they purchased some time ago. Strong claims are made for the quality of galvanized sheets made under this process, and it is the intention of the company to furnish them from their Youngstown works in a short time.

The rolling mill at Wheatland, Pa., is being greatly improved by its present management. Ephraim Truxall of Pittsburgh has been made the general manager, and he will have control of the new improvements about to be made and will continue afterward as general superintendent. He has recently been manager of one of Singer & Nimick's mills in Pittsburgh and still retains his home in that city. The puddling department started on Monday, December 9. When the plant is running full it will give employment to about 300 men. It is stated that a number of first-class puddlers are still needed.

The Neshannock blast furnace of the National Steel Company, New Castle, Pa., is receiving improvements of the most extensive nature. It has been blocked up 25 feet and new foundations are being put in.

The New Castle Forge & Bolt Company have their new works, at New Castle, Pa., pretty well under way, and expect to be in position to turn out bolts, rivets, chain and forgings on or shortly after January 15 next. They have placed contracts for part of their machinery with the Acme Machinery Company of Cleveland, Ohio. Frank Ryman, who for many years was connected with the Oliver Iron & Steel Company of Pittsburgh, is president.

The Allegheny Steel & Iron Company, Park Building, Pittsburgh, with mills at Avenue, Pa., manufacturers of fine sheet steel, will add another furnace to their open hearth steel department, and also increase their capacity for the manufacture of sheets. The plant of this company was started up some time ago and contains one 50-ton open hearth furnace, soaking pits, three-high bar mills, four sheet mills, one tin mill, one jump mill and four sets of cold rolls. The product of the plant is 40 to 50 tons of sheets per day.

The Atlantic Iron & Steel Company, Edwin N. Ohl, general manager, operating Atlantic Furnace, at New Castle, Pa., will rebuild this furnace during the coming year, put in a skip hoist

and add some new boilers and engines. It is intended to materially increase the capacity of the furnace.

Plans are being prepared for the proposed new tin plate mill for the American Tin Plate Company, which is to be built in the Pittsburgh district, and which will adopt entirely new methods in the manufacture of tin. While the officials will not say so, it has been intimated that the new plant will be a ten-mill one.

At the annual meeting of the Central Iron & Steel Company, Harrisburg, Pa., held last week, the following officers were re-elected: Edward Bailey, president; James M. Cameron, vice-president; S. B. Bonde, secretary, and James B. Bailey, treasurer and general manager. The former Board of Directors were also re-elected.

The Carnegie Tube Company have about finished their new tube mill at West Carnegie, Pittsburgh. The initial capacity of the plant will be from 60 to 80 tons of $\frac{1}{2}$ to 3 inch butt weld pipe per day.

General Machinery.

The Southern Metal Company of Orangeburg, S. C., will shortly be incorporated with a capital of \$10,000 for the manufacture of sheet metal goods and wrought iron work for building purposes, and a planting machine. A building, 60 x 150 feet, will be erected, which they hope to have in operation by February 1. Communications should be addressed to Thos. E. Hoffman.

Heywood Brothers & Dobbins, Jennings, La., have purchased the machine shop of Boehm Bros., which they will enlarge as trade requires. Considerable new machinery has already been installed.

The Merrill Railway & Lighting Company, Merrill, Wis., contemplate spending \$40,000 in improving their plant. They advise us that they will require two dynamos and eight water wheels.

The Inland Tool & Mfg. Company, Chicago, Ill., recently incorporated, have taken over the plant and business of the Inland Mfg. Company, which they will continue as heretofore. They make tools for watchmakers and jewelers.

The Webster, Camp & Lane Company, who are erecting a large plant at Akron, Ohio, are receiving a carload of machine tools which were on exhibition at the Pan-American Exposition. Part of them will be set up in the old plant and the balance will be stored until the new plant is completed.

The Alliance, Ohio, Board of Trade has closed an agreement with Cleveland people for the location in Alliance of the plant of the Alliance Machine Company. The new company have been incorporated with \$200,000 capital stock by W. C. Whitehead, Norton T. Horr, C. L. Denton, Fred R. Fuller and E. M. Forbes. The company will manufacture iron working machinery and will erect a plant near the plant of the Morgan Engineering Company. The site gives excellent shipping facilities over the Pennsylvania and the Lake Erie, Alliance & Wheeling lines.

The Turner, Vaughn & Taylor Company of Cuyahoga Falls, Ohio, are preparing to make a number of improvements to their plant. Their present machine shop will be dismantled and a new shop built adjoining their erecting shop, which was recently finished. They will buy considerable new machinery for the new machine shop. It is probable that a new foundry will be erected also.

The Reade Machinery Company of Cleveland, Ohio, dealers in second-hand machinery and dismantled plants, have bought the plant of the Porter Mfg. Company, Syracuse, N. Y., including the equipment, machine shop, foundry, boiler shop, pattern shop and drafting room.

The Excelsior Iron Works, Cleveland, Ohio, will on January 1 be organized as the Excelsior Hoisting Machinery Company. They have on hand a number of contracts for swinging derricks, conveying machinery, coal and ore buckets, and are planning to rearrange their plant so as to take care of increased business. They will purchase considerable electrical equipment.

Geo. Juengst & Sons, Croton Falls, N. Y., manufacturers of machinists' tools, are enlarging their plant by the erection of an addition to be used for the manufacture of a new book binding machine which they are putting on the market.

The Green Ridge Coal Company, Scranton, Pa., are in the market for entire breaker equipment to replace that lost in the fire which recently destroyed the breaker, causing a loss of \$60,000. It is said that the breaker was one of the largest and best equipped in the Lackawanna Valley.

The Terre Haute & Indianapolis Railroad Company, Terre Haute, Ind., are building a new erecting shop over and around erecting shop No. 2 and the valve shop. The new shop will also be known as No. 2, and will be 155 x 102 feet, of brick, with composition roof, and will have five engine pits.

The Ohio Blow Pipe Company, Cleveland, Ohio, recently organized, have established a modern plant at Seneca and Michigan streets, for the manufacture and installation of complete dust collecting systems, consisting of Cyclone dust collectors, furnace feeders, galvanized iron piping, hoods, &c., for the collection of dust and other refuse from planing mills, foundries, metal polishing and buffing plants, &c. The officers are Frank C. White of the Frank C. White Tool & Supply Company of

Cleveland, president; J. D. Swartwout, vice-president; Harry N. Clarke, secretary; D. K. Swartwout, treasurer, and Edward Coney, manager.

The Murray Company, Dallas, Texas, machinists, founders and manufacturers of Murray ginning system machinery, are in the market for some equipment for the new cotton gin shops they are to erect on 11 acres of land, recently purchased, on the Texas & New Orleans Railroad. About \$150,000 will be expended in erecting modern and thoroughly equipped shops, the plans for which are now being prepared. The present capacity will be doubled.

The Wolf Company, Chambersburg, Pa., manufacturers of flour mill machinery, have contracted to furnish the machinery for a 600-barrel capacity roller flour mill for the Sperry Flour Company, San Francisco, to be erected at Marysville, Cal.

The Jacobson Machine Mfg. Company, Warren, Pa., have been recently incorporated under the laws of the State of Pennsylvania. They have just finished an extension to their foundry which doubles its capacity. They are at present installing an electric light plant. The generator is driven by a Warren automatic gas engine designed by Mr. Jacobson. They furnished all the power transmission machinery required by the Warren Street Railway Company for their power plant at Stoneham. This is said to be the longest electrical railway in the world run by a gas engine. It connects Warren and Sheffield, a distance of 13 miles. The general trade of the company keeps rapidly increasing. Within a month they have exported to Switzerland two friction clutch pulleys. This is a test order. Proving satisfactory, the company fully expect larger orders will follow. They are about putting on the market a new vise applicable to all kinds of work in either wood or iron.

The Verona Tool Works, at Verona, Pa., near Pittsburgh, have completed some important improvements and additions to their forging department. A number of new forges have been added and the entire department has been lighted with electric lights. They are also adding a new nut lock department, which will be ready for operation within a month.

Perry Ransom, manufacturer of machinery and tools, Oshkosh, Wis., has sold his business to the Ransom Mfg. Company, just organized with a capital stock of \$25,000. The new company will conduct the business on about the same lines as heretofore.

The Wisconsin Machinery & Mfg. Company have just organized as a corporation under the laws of Wisconsin, with a capital stock of \$25,000. They have purchased all the assets of the Wisconsin Machinery Company, consisting of the business formerly conducted by Louis E. Vogel, and will continue to maintain their salesrooms at 125 and 127 West Water street, Milwaukee. The company are manufacturers of machinery and dealers in new and second-hand machinery and power supplies. They have opened a machine shop at Canal street and Muskegon avenue. William H. Vogel is president; J. W. Otto, vice-president, and Louis E. Vogel, secretary and treasurer.

C. L. Grimes, superintendent, and J. F. Warren, foundry foreman, for Williams, White & Co., Moline, Ill., have made arrangements to operate a machine shop and foundry in Wichita, Kan., after January 1, 1902. They will incorporate under the name of the Wichita Mfg. Company, and expect to do a general jobbing business.

The recently organized Bradley Mfg. Company, 58 Vandergrift Building, Pittsburgh, will require a good many special tools for the new plant they are to erect at Allegheny, Pa., for the manufacture of the Williams central valve engine. They expect to have the works completed in about three months.

The plant of the Pittsburgh Friction Draft Gear Company, recently organized at Pittsburgh, will be located at Canton, Ohio. It is understood that they are an identified interest of the Structural Steel Car Company, now erecting a plant at Canton, for building box and mining cars and railroad equipment.

The Springfield Metallic Casket Company, Springfield, Ohio, advise us that they will shortly be in the market for some additional electric motors. The company are to erect a five-story addition to their plant to be used for the manufacture of casket hardware.

The Alan Wood Company, Conshohocken, Pa., placed an order with the Mesta Machine Company, Pittsburgh, Pa., for a pair of piston valve reversing engines, 50 x 60. These are to be direct connected and will be used for driving the new blooming mill that the Alan Wood Company will install. The contract for a pair of 40 x 60 reversing engines, geared 5 to 7, for operating their new blooming mill, has been placed with the Mesta Company by the La Belle Iron Works.

Bottles, Engines and Accessories.

The Sumpter Development Company, Sumpter, Ore., are in the market for a large boiler, high speed engine and direct current generator. The company are to construct an electric road between Sumpter and Bourne, the power for which is to be supplied from the Sumpter Light & Power Company's plant, which they own, and the new equipment is required to supply the necessary increase of power. Seymour H. Bell is secretary and treasurer.

The water works trustees of Madisonville, Ohio, will receive bids to December 24 for one 200 horse-power water tube boiler, one 225 horse-power automatic engine, one 125-light arc dynamo and one 100-kw, alternating current generator, with switchboard. D. E. Sauer is clerk.

The Ayres Gasoline Engine & Automobile Works, Saginaw, Mich., have incorporated under the same name. The new company will considerably enlarge the plant and increase the output. The officers are W. F. Ayres, president; G. W. Morley, vice-president; H. Pistorius, secretary, and H. Goeschel, treasurer.

James Greenwood, Coatesville, Pa., has purchased the plant and patents of the Bordo Valve Company at sheriff's sale for \$11,000. The works have been started up and the manufacture of the Bordo blow off valves and swing joints will be continued.

The Ridgway Dynamo & Engine Company, Ridgway, Pa., expect to have their new additions completed, machinery installed and the whole plant fully running by the middle of January. The additions to the foundry are finished, the electric cranes in that department installed, and with the new boiler plant are in operation. The enlargement doubles the size of the works and more than doubles the productive capacity. The amount of work the company have in hand is larger than at any previous period, and the prospect is that the new works will be taxed to the fullest extent to execute orders.

The Fleming Boiler Works of New Castle, Pa., have received an order for six new stacks for the New Castle works of the National Steel Company. Each stack will be 155 feet high, 7 feet in diameter and each will weigh about 30 tons. The stacks are to be erected for 5000 horse-power Babcock & Wilcox boilers.

George H. Hunter, Mayor of Wellington, Kan., advises us that in about two weeks plans and specifications will be prepared and bids received at the City Clerk's office for all or part of the machinery for the electric light plant to be erected by that city. Bonds amounting to \$15,000 have been voted for the establishment of the plant, and A. M. Patitz has been employed as electrical engineer to prepare plans and specifications, also to superintend construction and put in all machinery, wire, &c. Plans and specifications may be had upon application as soon as they are ready.

Fires.

The Riverview Knitting Mills, at Tarboro, N. C., were destroyed by fire December 12. Loss is about \$50,000, with about \$35,000 insurance.

The saw factory of J. Oldham & Son's Company, Brooklyn, N. Y., was last week destroyed by fire. The loss is estimated at about \$75,000.

The plant of the Island Foundry Company, at Mechanicville, N. Y., was totally destroyed by fire December 14. The loss is about \$60,000, partially covered by insurance.

The plant of the Brooklyn Cooperage Company, Brooklyn, N. Y., was destroyed by fire December 15. Loss amounts to about \$250,000.

The factory of Tenny & Porter, celluloid and horn goods, Leominster, Mass., was burned last week. Loss is about \$20,000.

The new knitting mill of Meeker & Link, at North Hoosick, N. Y., was destroyed by fire December 17. Machinery valued at \$12,000 is ruined, and the total loss will reach \$20,000, partly covered by insurance.

Foundries.

The Frayer & Melton Mfg. Company, Henderson, Ky., boiler makers, founders and machinists, have purchased a lot on Fourth and Water streets upon which they will erect a foundry, to consist of two buildings, one 40 x 100 feet, the other 36 x 80 feet. They are now purchasing the equipment.

The Brookside Foundry Company, Cleveland, Ohio, have been succeeded by the Brookside Brass & Foundry Mfg. Company, who have been incorporated with \$10,000 capital stock by John Mueller, Frank Lukon, H. Vogel, Fred Flisch and Ernst Juergens. They will carry on a brass foundry business and make plumbers' supplies. They will purchase a number of brass working tools.

The Keeler Brass Company, Grand Rapids, Mich., manufacturers of brass furniture trimmings, are in the market for the equipment for their new brass foundry. The contract for the building has been let and they expect to have it in operation by February 1.

Thomas Devlin & Son, Philadelphia, Pa., manufacturers of malleable iron fittings, castings, &c., are negotiating with the local improvement association of Burlington, N. J., for the removal of their plant to that place. Though nothing definite has as yet been decided, there is a possibility that Burlington will get the works, as the firm are at present very much in need of more room.

The Michigan Wheelbarrow & Truck Company, Saginaw, Mich., advise us that they are in the market for sand, pig iron and foundry supplies. The company lately enlarged their plant by the erection of a brick addition, 60 x 100 feet, which is to be used as a foundry, and which they hope to have in operation by January 15. The cupola has been purchased.

The Pittsburgh Meter Company, at East Pittsburgh, manufacturers of water and gas meters, have commenced work on a new brass foundry, which will be 50 x 80 feet in size, and will

contain all the latest and most improved devices for the manufacture of brass castings, and will be made a model foundry in every way. Other buildings will be erected by this firm, the exact sizes of which have not as yet been determined, but they will probably be 250 feet long by 60 feet wide, three stories high, and a three or four story office building. The additional buildings are needed by this concern to take care of their greatly increased business in water meters and gas meters.

Bridges and Buildings.

Robert L. Johnson, superintendent of public works, Columbus, Ga., informs us that the survey has been made and bids will shortly be asked for the construction of a steel bridge, about 712 feet long, to carry electric car traffic, across the Chattahoochee River at foot of Fourteenth street. The plans and specifications are now being prepared. Forty thousand dollars of 4 per cent. ten-year gold bonds have been voted for the purpose. The bonds will be placed on sale about January 10.

The King Bridge Company of Cleveland, Ohio, have been awarded a contract for erecting a \$500,000 bridge across the Des Moines River at Ft. Dodge, Iowa, for the Chicago Great Western Railway.

The Ohio River Bridge & Ferry Company of Marietta, Ohio, have contracted for \$200,000 worth of structural steel for the superstructure of their new bridge.

Hardware.

The broiler patents owned by E. A. Leland, Great Barrington, Mass., have lately been purchased by Frank H. Wright and others, the intention being to arrange as soon as practicable for the manufacture of the broiler. Dies for stamping are now in course of preparation and will be about all the new equipment needed. The broilers will be made of sheet iron.

W. F. Hunt has purchased the Spore Steel Fence Post Company's factory in Newark, N. Y., and will convert it into a manufacturing plant for anti-rust tinware.

The Warren Axe & Tool Company, Warren, Pa., who have been established ten years, have been running full time during the whole of this year and have now both day and night shifts. This has become necessary from the pressure of business, notwithstanding the fact that the capacity of the works has been doubled within the last six months. Their present capacity is 50,000 axes monthly. A full line of special patterns and special brands of single and double bit axes, fireman's and ice axes, turpentine axes, hackers, bark spuds, &c., are manufactured. The company are about to duplicate their present plant for the manufacture of a complete line of edge tools. Their product goes into every State in the Union and they have also a considerable export trade.

Miscellaneous.

The Page Woven Fire Fence Company, Adrian, Mich., have been incorporated by Frederick P. Swift, Jay Charles Davis and John Milton Ferry of Jersey City, N. J., with a capital stock of \$6,000,000, \$1,000,000 of which is preferred with 7 per cent. noncumulative dividend. This increase of capital was necessitated by the large increase of business, the company's sales for November being \$135,000, against \$55,000, the best they ever had before in that month.

The Parish & Bingham Company of Cleveland, Ohio, manufacturers of sheet metal stampings, bicycle parts, &c., are having plans prepared for an addition to their plant, 50 x 300 feet, two stories. Building will commence as soon as weather permits.

The Republic & Grand Forks Railway of British Columbia has placed an order with F. M. Hicks of Chicago, Ill., for two modern coaches and a passenger engine. One of the coaches is to be a straight passenger and the other a combination. These are to be finished in Pullman colors, interior to be of oak with flat oil finish, Hale & Kilburn 26-inch high back walk over seats, steel platforms, pantosote curtains, and continuous hat racks. The locomotive is to be an eight-wheel, 17 x 24 passenger with 56-inch wheel centers, Monitor injector, Nathan lubricator, air sander, air bell ringer, and a 3500-gallon tank.

The Bostwick Steel Lath Company of Niles, Ohio, held their directors' meeting last week and declared a 5 per cent. semi-annual dividend. All departments were reported to be running full blast and the outlook most promising.

The power house of the Ithaca Street Railway Company, Ithaca, N. Y., was wrecked by the storm which swept over that city on Sunday.

The Peters Cartridge Company of Cincinnati have made some extensive additions to their plant at Kings Mills, Ohio, among which are two 200 horse-power engines, direct connected to electric generator; two new boilers, and a new water plant with 8 and 12 inch mains for fire protection, used in connection with an improved sprinkler system. A new 2,000,000-gallon reservoir has been constructed and the following buildings have just been completed: One 50 x 90 feet, two stories; one 50 x 60 feet, two stories; one 60 x 60 feet, two stories, and a two-story addition 16 x 280 feet.

The Bashlin Company, Warren, Pa., manufacturers of Bashlin valves, have just built a new office building and wash rooms for their workmen. They have just placed on the market a line of check valves are built on the same principles as their regular

globe valve. During the whole of this year the company have experienced an increasing demand for their valves, sales for November having been larger than that of any former month since commencing. The business came largely through jobbers and from individual plants in course of erection.

The Globe Machine & Stamping Company of Cleveland, Ohio, have commenced operations in new quarters at 970-972 Hamilton street, that city, where they have treble their former floor space. They have recently purchased several new tools and are contemplating buying additional machinery. They manufacture special tools, dies, stamped metal work, hardware specialties and small machinery.

The Hicks Locomotive & Car Works are extending their plant at Chicago Heights, Ill. They have recently purchased a two-story brick building covering a ground area of 100 x 250 feet for the purpose of securing additional space needed for some of their departments. They have also prepared plans and specifications for a brick building, 100 x 250 feet, to be used in finishing cars.

Ohio C. Barber is planning to erect at Barberton, Ohio, an immense electrical plant to furnish light, power, ice, steam for heating and water, sufficient to supply the needs of the entire town. It is his aim to make this plant the only place in the town in which a boiler or any form of fire would be required.

The Lodi Steel Box Mfg. Company of Lodi, Ohio, have been incorporated with \$25,000 capital stock. A. B. Taylor, F. C. Lovejoy, J. B. Taylor, Alfred Krause and L. A. Minus are interested.

Beckley & Myers of Springfield, Ohio, will erect an artificial ice plant with a capacity of 25 tons per day.

The stockholders of the Co-operative Wagon & Machine Company of Salt Lake City, Utah, will meet Dec. 23 to decide upon the consolidation of that company with the Consolidated Implement Company of the same city. Both companies deal in agricultural implements and operate in the same territory, and are to combine for the purpose of reducing expenses. We are advised that there is little question but that the amalgamation will be effected at an early date and it is believed that the new concern will be operating by February.

The Diamond Rubber Company of Akron, Ohio, will enlarge their power plant and will probably decide to drive all machinery by electricity. They have increased their capital from \$500,000 to \$1,500,000 to provide for improvements.

The B. F. Goodrich Company of Akron, Ohio, confirm the report that they are preparing plans for the erection of a new factory building. It will be larger than any of their present buildings.

The North American Graphite Company, Buckingham, P. Q., are operating night and day and are about to quadruple their capacity. H. P. H. Brummell is manager.

The Mildrum Camphor & Chemical Company, Blackshear, Ga., have incorporated with a capital of \$500,000 for the purpose of manufacturing camphor and its by-products, arsenic and starch. A site has been secured and shortly after the first of the year the erection of the plant will be begun. The officers and directors are Archibald Mildrum of Blackshear, president; M. Frank of New York City, vice-president; C. G. Murray of Blackshear, secretary; M. Temple Taylor of Savannah, Ga., treasurer; Gardner W. Kimball of Wilmington, Del.

The Superior Water, Light & Power Company, West Superior, Wis., will require a quantity of equipment for the large improvements they intend making to their plant during the coming year. The cost of these will exceed \$35,000, and they will consist of electrical station equipment, line extension, change of transformers and arc lamps, and extension and improvement in distribution department of gas. The details are not yet known, as the plans have not been completed.

The Kansas City Die & Mold Company, recently organized, have located at 604-608 West Fifth street, Kansas City, Mo., where they are prepared to make all kinds of dies and molds. They make a specialty of glass and soap molds, embossing, cutting and stamping dies. The proprietors are C. F. Bartholomew and G. Magnien.

The Toledo, Hicksville & Ft. Wayne Railway Company, Toledo, Ohio, have incorporated with a nominal capital of \$15,000. They propose to build an electric road from Toledo to Bryan, Ohio, connecting with the Toledo & Indiana Railroad and making a through connection from Toledo to Ft. Wayne, Ind. It has not yet been decided where the power plant will be located. The officers are Chas. P. Griffin, president; E. B. Smith, vice-president, and A. K. Detwiler, secretary and treasurer.

The Kennedy & Sullivan Mfg. Company, Holyoke, Mass., steam and hot water heating, tinning, plumbing, &c., have leased the building adjoining their plant and will build an addition to the brass foundry 25 feet long and two additions for storage purposes. Most of the additional room will be used for the manufacture of Mr. Sullivan's patent anti-water hammer hydrant, which they are about to put on the market, and for the manufacture of brass valves.

The Demeritt & Palmer Packing Company, Waterbury, Vt., canners of corn, have purchased the machinery and intend to make their own cans.

The Iron and Metal Trades.

It is probable that a meeting of the Lake Iron Ore producers will be held at Cleveland this week, at which prices will be established on the principal grades at the present level of values. Some of the independent mines have entered into contracts with furnacemen for delivery of Ore for a series of 10 years, in some cases at close prices, but the tonnage so placed is not as large as reported. Other interests have made five-year contracts. Some of these transactions are not recent, however. Some furnace interests which do not purchase for more than two years at the utmost took up their next season's supply some time since. On the whole a good deal of outside tonnage has been placed, to some extent for a considerable number of years.

A feeling is growing that it will take all the power of the leading interests to keep the market from running away in Iron and Steel, since it actually begins to look like a scarcity in spite of our enormous production. This looks like an exaggeration of the case. We are quite near the importation point on quite a number of articles, while in other branches the markets are not any too firm. It is true that this applies to goods kept relatively high.

Color is given to the views of the alarmists by the ease with which the whole machinery of production and distribution is thrown out of gear by any disturbance. When everything is keyed up as sharply as it is now any mishap interferes very seriously with output and with shipments, and the cry of disgust and of protest is sounded all along the line.

In the Central West there has been further heavy buying of Bessemer, Basic and Foundry Iron, and there has also been at least one block of 10,000 tons of foreign Bessemer placed. The latter, however, is probably needed to cover sales of Rails to Mexico.

Surprises are following one another rapidly in the Copper trade. To-day the price was again dropped, this time to 14c., and yet it is doubtful whether this will stimulate buying. What little confidence there was vanished with the first marking down. Conflicting reports are heard as to the actual selling price of really merchantable Copper in Europe. The speculation chips used in London are almost worthless from a consumer's point of view, even adding 1c. per lb. for refining. Whether the great mass of consumers will take hold at 13c. and a guarantee remains to be seen.

If the stage had not been so thoroughly filled with the spectacle of the Copper collapse, Lead might have claimed its share of attention. As it is, the dance is proceeding in the files. The price has been dropped to 4c., somewhat prematurely probably, owing to the weakness abroad. The smelting interest has performed quite a *tour de force* with Lead for many months, and has now called in the miners to help. It appears that 80 per cent. of the great Rocky Mountain districts have assented to having the price in Ore cut down from 3.90c. to 3.50c., and have agreed to shut down when the market demands it. So much for this country. But who will stop Mexico and back up the European consumption, so that the Lead in bond in New York Harbor does not find the line of least resistance into the hands of American consumers in spite of the duty?

A Comparison of Prices.

At date, one week, one month and one year previous.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

Dec. 18, Dec. 11, Nov. 20, Dec. 19,
1901. 1901. 1901. 1900.

PIG IRON:

Foundry Pig, No. 2, Standard, Philadelphia	\$15.75	\$15.50	\$15.50	\$15.75
Foundry Pig, No. 2, Southern, Cincinnati.....	14.25	14.25	14.25	18.75
Foundry Pig, No. 2, Local, Chicago	15.50	15.50	15.00	15.00
Bessemer Pig, Pittsburgh.....	16.50	16.25	16.00	18.50
Gray Forge, Pittsburgh.....	15.00	15.00	14.50	18.25
Lake Superior Charcoal, Chicago..	18.50	18.00	17.00	19.50

BILLETS, RAILS, ETC.:

Steel Billets, Pittsburgh (nom)....	27.00	28.00	27.00	19.75
Steel Billets, Philadelphia (nom)..	29.00	29.00	29.00	21.00
Steel Billets, Chicago, (nom).....	....	....	....	20.75
Wire Rods (delivered).....	34.25	34.50	35.50	33.00
Steel Rails, Heavy, Eastern Mill..	28.00	28.00	28.00	28.00
Spikes, Tidewater.....	2.00	2.00	1.80	1.50
Splice Bars, Tidewater.....	1.65	1.65	1.50	1.85

OLD MATERIAL, PER GROSS TON:

O. Steel Rails, Chicago.....	14.00	14.00	14.00	11.00
O. Steel Rails, Philadelphia.....	18.00	17.75	17.25	16.00
O. Iron Rails, Chicago.....	21.50	21.00	21.50	17.50
O. Iron Rails, Philadelphia..	21.50	21.50	21.50	17.50
O. Car Wheels, Chicago.....	15.50	15.50	15.50	15.50
O. Car Wheels, Philadelphia (nom).	16.75	16.75	16.00	17.00
Heavy Steel Scrap, Chicago.	13.50	13.50	13.50	11.00

FINISHED IRON AND STEEL, PER POUND:

Refined Iron Bars, Philadelphia...	1.65	1.65	1.62½	1.40
Common Iron Bars, Chicago.....	1.65	1.65	1.65	1.30
Common Iron Bars, Youngstown.	1.55	1.55	1.55	1.45
Steel Bars, Tidewater.....	1.70	1.70	1.70	1.40
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.25
Tank Plates, Tidewater.....	1.75	1.75	1.75	1.58
Tank Plates, Pittsburgh.....	1.80	1.80	1.80	1.40
Beams, Tidewater.....	1.75	1.75	1.75	1.65
Beams, Pittsburgh.....	1.60	1.60	1.60	1.50
Angles, Tidewater.....	1.75	1.75	1.75	1.55
Angles, Pittsburgh.....	1.80	1.80	1.80	1.40
Skelp, Grooved Iron, Pittsburgh..	1.73½	1.73½	1.80	1.52½
Skelp, Sheared Iron, Pittsburgh..	1.80	1.80	1.85	1.55
Sheets, No. 27, Pittsburgh.....	2.00	2.00	3.00	2.85
Barb Wire, f.o.b. Pittsburgh.....	2.00	2.00	2.90	2.80
Wire Nails, f.o.b. Pittsburgh.....	1.95	2.00	2.15	2.30
Cut Nails, Pittsburgh.....	2.05	2.05	2.05	1.95

METALS:

Copper, New York (nom).....	13.87½	16.50	16.85	17.00
Spelter, St. Louis	4.12½	4.17½	4.19½	3.90
Lead, New York.....	4.00	4.97½	4.37½	4.37½
Lead, St. Louis	3.95	4.25	4.25	4.30
Tin, New York.....	24.50	25.25	27.00	25.50
Antimony, Hallett, New York....	8.85	8.87½	8.87½	9.25
Nickel, New York.....	60.00	60.00	60.00	55.00
Tin Plate, Domestic Bessemer, 100 lbs., New York.....	4.19	4.19	4.19	4.19

Chicago.

FISHER BUILDING, December 18, 1901.—(By Telegraph.)

The demand for material for railroad purposes is a prominent feature of current trade. The car builders have recently been heavy buyers of all classes of materials. It is believed that the car builders, as well as the locomotive manufacturers, are supplied with orders which will require at least six months to fill and still more orders are coming in. The pressure on the railroads is not diminishing. They have not been able to improve the Coke situation, and the furnaces and foundries in this district are still in straits because of the irregularity of Coke delivery. The great car shortage is also interfering with the delivery of finished products. The manufacturers in Pittsburgh and vicinity are kept busy making excuses to their customers in this district. Thousands of tons are prevented from being shipped from lack of cars. One company report 10,000 tons in their yards waiting for cars. It is remarkable that under such circumstances the railroads running west of the Missouri River are cutting freight rates. It is explained, however, that it has always been their custom in December to reduce their rates to enable the jobbing interests in that section to lay in large stocks of goods for their spring trade.

Pig Iron.—The deliveries for which furnace companies are willing to take orders are getting further off. It is now quite difficult to find either Northern or Southern

furnaces prepared to assure shipments beginning earlier than next April, except in the case of certain grades. The standard grades are well sold up. The furnace companies are still hampered greatly by the scarcity of Coke and lack of cars, and it is believed that it will take until April to enable them to catch up even if no additional business is booked. The week has been characterized by some heavy trades. The largest purchasers were the machinery and implement manufacturers. The transactions in some cases ran up to several thousand tons. Southern Iron was mainly bought, although the share falling to the local furnaces was by no means small. Additional sales could have been made for delivery beginning in January if Iron could have been promised at that time. A sharp demand is noted for spot Iron. A great many foundries are buying from hand to mouth and need prompt deliveries. A disposition is noted to advance prices on Southern Iron, as some companies have made advances of from 25c. to 50c., but this movement is not yet general. We quote as follows:

Lake Superior Charcoal.....	\$18.50 to \$19.25
Local Coke Foundry, No. 1.....	16.00 to 16.50
Local Coke Foundry, No. 2.....	15.50 to 16.00
Local Coke Foundry, No. 3.....	15.00 to 15.50
Local Scotch, No. 1.....	16.00 to 16.50
Ohio Strong Softeners, No. 1.....	17.60 to 17.85
Southern Silvery, according to Silicon.....	16.15 to 16.40
Southern Coke, No. 1.....	15.65 to 16.15
Southern Coke, No. 2.....	15.15 to 15.65
Southern Coke, No. 3.....	14.65 to 15.15
Southern Coke, No. 1 Soft.....	15.65 to 16.15
Southern Coke, No. 2 Soft.....	15.15 to 15.65
Foundry Forge.....	14.15 to 14.65
Southern Gray Forge.....	14.15 to 14.65
Southern Mottled.....	14.15 to 14.65
Southern Charcoal Softeners, according to Silicon.....	15.00 to 16.00
Tennessee Silicon Pig.....	16.40 to 16.65
Alabama and Georgia Car Wheel.....	19.50 to 20.50
Malleable Bessemer.....	17.00 to 17.50
Standard Bessemer.....	.... to 17.50
Jackson County and Kentucky Silvery, 8 per cent. Silicon.....	17.00 to 17.65

Bars.—A much better condition of trade is reported. Some of the largest Steel manufacturers, as well as leading Bar Iron makers, report more business placed so far this month than booked during the whole of November. The Steel trade had for a short time the appearance of quietness, but a change has occurred in this respect. The car builders have been heavy buyers, but other consuming interests have also found it necessary to enter the market. The outlook for the Bar interests is considered brighter than at the corresponding time last year. The leading Bar Iron manufacturers are not favoring the taking of long time contracts at present, but are instructing their salesmen to confine themselves to orders. The belief is strong among manufacturers that an advance can be made early in the new year. Mill shipments are quoted at 1.65c. to 1.80c., Chicago, for either Bar Iron or Soft Steel, and 2.05c. to 2.20c., base, for Hoops. Jobbers continue to enjoy a large movement from store, and report shortages in small Angles and other Shapes. Steel Hoops are quoted at 2.50c., base, from store, and Bars 1.90c. to 2c.

Structural Material.—Transactions have been numerous, and the tonnage placed has run up to large figures. No single contract of magnitude is reported, the buying coming from the trade generally. The scarcity of cars is causing great trouble in making deliveries on contracts. The mills are particularly crowded with work on Beams of 8 inches and under, on which they are not now making any promises relative to shipments. Large Beams can be furnished with reasonable promptness. Mill shipments are quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c.; small lots of Beams and Channels from local yards are quoted at 2.25c.; Angles, 2c. rates; Tees, 2.15c.

Plates.—The tonnage of orders placed is growing much larger, and the mills are therefore in considerably better shape than they have recently been. The jobbers are also enjoying a better demand from store. Mill shipments are quoted as follows: Tank Plate, $\frac{1}{4}$ -inch and heavier, 1.75c. to 1.80c., Chicago; Flange, 1.85c. to 1.95c.; Marine, 1.95c. to 2.05c. Jobbers are selling small lots from store at 1.90c. to 2c. for Tank, and 2.25c. for Flange, with the usual extras for heads, segments, lighter gauges, &c.

Sheets.—The conditions previously reported are unchanged. The leading manufacturers are still much in arrears on deliveries, and the independent mills are unable to promise shipments inside of 60 days. The receipts, therefore, are falling under the requirements of the market, and this keeps prices firm. Mill shipments of No. 27 Black Sheets are quoted at 3.15c. to 3.40c., Chicago, and small lots from stock are selling at 3.50c. to 3.70c. Small lots of Galvanized are quoted at 70 to 70 and 2 $\frac{1}{2}$.

Merchant Pipe.—Severe winter weather is responsible for a further falling off in the demand. Contracting is not expected at present, and business will probably continue light until after the turn of the year. Some very good orders are in sight for large power houses requiring a great deal of Piping. Carload lots are now quoted as follows, random lengths: Black, $\frac{1}{8}$ to $\frac{1}{2}$ inch, 60 off; $\frac{3}{8}$ to 10 inches, 67 off; Galvanized, $\frac{1}{8}$ to $\frac{1}{2}$ inch, 47 off; $\frac{3}{8}$ to 6 inches, 55 off.

Boiler Tubes.—The demand is fair. Quotations are as follows:

	Steel.	Iron.
2 $\frac{1}{2}$ to 5 inches.....	57 $\frac{1}{2}$	47 $\frac{1}{2}$
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ inches.....	50	40
1 to 1 $\frac{1}{2}$ inches.....	35	30
6 inches and larger.....	52 $\frac{1}{2}$	45

Merchant Steel.—The demand for Spring Steel is a special feature of current trade. The mills report heavy specifications against contracts which keep them running to full capacity. The Tool Steel trade is not particularly active, the demand being confined almost wholly to small lots. Mill shipments, Chicago, are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.85c. to 2c.; Open Hearth Spring Steel, 2.30c. to 2.40c.; Toe Calk, 2.40c. to 2.60c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 55 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6 $\frac{1}{4}$ c. for carloads and 7c. to 7 $\frac{1}{2}$ c. from store; Specials, 12c. upward.

Rails and Track Supplies.—The local mills have taken a nice tonnage for delivery next December. This is the earliest delivery which they are now able to promise. Orders have gone to Eastern Rail mills during the week to the extent of probably 25,000 tons. These mills are also getting so full of work that they can only promise fall delivery. Light Rails are in strong demand, and the local mills are sold ahead for 60 days. Standard Sections are quoted at \$28, and Light Rails at \$30.50 to \$35. A heavy trade is in progress in Spikes and other fastenings. Track Fastenings are as follows: Splice Bars, 1.70c. to 1.80c.; Spikes, 2c. to 2.10c.; Track Bolts, with Hexagon Nuts, 2.90c. to 2.95c.; Square Nuts, 2.75c. to 2.80c.

Billets.—Sales of carload lots of Open Hearth Billets are being steadily made at \$33 to \$35, Chicago. No transactions have been reported in Bessemer Billets.

Old Material.—The principal buyers appear to be the dealers who have contracts with rolling mills yet to be filled. They are offering higher prices than the mills are now willing to pay. It is also believed that some of the dealers are speculatively inclined, and are securing such stock as they can at present, being confident that higher prices will prevail later in the winter. The rolling mills are pursuing the policy of keeping prices down, and are finding a sufficient number of dealers ready to accept their prices to keep themselves well stocked. The following are approximate quotations per gross ton:

Old Iron Rails.....	\$21.50 to \$22.00
Old Steel Rails, mixed lengths.....	14.00 to 14.50
Old Steel Rails, long lengths.....	19.50 to 20.50
Heavy Relaying Rails.....	25.50 to 26.00
Old Car Wheels.....	15.50 to 16.00
Heavy Melting Steel Scrap.....	13.50 to 14.00
Mixed Steel.....	10.50 to 11.00

The following quotations are per net ton:

Iron Fish Plates.....	\$16.00 to \$17.00
Iron Car Axles.....	20.00 to 21.00
Steel Car Axles.....	18.00 to 18.50
No. 1 Railroad Wrought.....	15.00 to 15.50
No. 2 Railroad Wrought.....	13.25 to 13.75
Shafting.....	16.00 to 16.50
No. 1 Dealers' Forge.....	12.15 to 13.00
No. 1 Busheling and Wrought Pipe.....	.... to 11.50
Iron Axle Turnings.....	11.25 to 11.75
Soft Steel Axle Turnings.....	10.50 to 11.00
Machine Shop Turnings.....	9.50 to 10.00
Cast Borings.....	5.00 to 5.25
Mixed Borings, &c.....	5.25 to 5.50

No. 1 Boilers, cut.....	11.00 to	11.50
No. 2 Boilers, cut.....	10.00 to	10.50
Heavy Cast Scrap.....	11.50 to	12.00
Stove Plate and Light Cast Scrap.....	9.00 to	9.25
Railroad Malleable.....	12.50 to	13.00
Agricultural Malleable.....	11.50 to	12.00

Metals.—The long expected has happened, and metals are considerably lower. Carload lots of Lake are now quoted at 15½c., and Casting brands at 15c., which is a reduction of 1½c. to 1¾c. Pig Lead has been reduced 37½c., and is now quoted at 3.95c. for Desilverized and 4.05c. for Corroding in 50-ton lots. Dealers quote selling prices on Old Metals as follows: Copper Wire and heavier, 14c. to 14½c.; Copper Bottoms, 13½c.; Pipe Lead, 4c.; Zinc, 2.75c.

Coke.—The supply of Coke continues inadequate to the requirements of the local trade. Consumers are taking any kind of Coke they can get, and paying \$5.50 to \$6 on track here. Contracts are being freely placed for the first six months of next year at \$5 to \$5.10 for Connellsville 72-hour Foundry Coke.

Philadelphia.

FORREST BUILDING, December 17, 1901.

The situation in the Iron and Steel trades is absolutely unprecedented, and to attempt to define or describe it satisfactorily is probably beyond any man's capacity. There is no precedent to fall back upon, there is no experience of anything like it in the past. A break down in any of the busiest streets in our busiest cities in the busiest part of the day comes pretty near to describing present conditions. Everything is jammed in one disorderly mass, and is apparently inextricable. So with the Iron and Steel trades, chaos reigns in every direction. Pig Iron, Billets, Sheets, Structural Material, Coal, Coke, Cars, Locomotives and almost everything else appear to be beyond reach. In some cases and in some places they are worse off than others, but all over the land the cry is, "Hurry up, or we shall have to shut down." Yet we are making at the rate of nearly 17,000,000 tons of Pig Iron per annum, and probably using more than we are making. The problem, therefore, is not what shall be done with such an immense product, but how can it be placed in the hands of those who have bought it and are begging for its delivery? When things get to a point like that there is the greatest anxiety to clear the tracks, yet the recent storms are causing worse blockades than ever. Tracks washed away, bridges down, mines flooded, everything going wrong, just at the time when it is most desirable that they should go right. It is a singular coincidence, yet perfectly true, that within the past two or three days two out of every three persons (connected with the trade) whom the writer has met casually have answered the inquiry of "How is business?" by replying, "Just going out to see if I can get some Iron for my customers, or try to beg off on deliveries." Nobody has any Iron to sell unless under very exceptional circumstances, and even then there is a good deal of hesitation before they say the final word. The same conditions prevail as regards Coal and Coke and Steel Billets, and to a lesser extent in some other lines, but even when the goods can be had there is no certainty of getting them moved within any reasonable time. It is a bad tie up all around, and at the moment there is nothing to give promise of permanent relief in the near future.

Pig Iron.—There is very little to be said under this heading, except that there is practically no Iron for sale for early shipments. Everything is close sold up, and more than that, as a great deal of Iron due for delivery this month cannot be got out, simply because the furnaces are oversold. The recent storm has still further complicated matters, so that Christmas will be looked upon as a positive relief, as the suspension of work may enable the belated ones to catch up. When that difficulty is surmounted, however, there is another equally hard to overcome—viz., the restricted facilities for transportation—so that the position of Pig Iron makers and their agents is not a happy one by any means. Under these conditions there is very little new business being done. Sellers are more interested in cleaning up old contracts than in making new ones—first, because

they are not quite sure what prices they ought to ask, and, second, because they do not want to be the first to lead off in an advance. This, of course, refers to long contracts, but for short dates no such scruples exist. The general impression is, however, that prices during the first half of the coming year will not be materially different to what they are to-day—say somewhere around \$16 for No. 2 X Foundry. Ores will be about the same as last year, but fuel and a few other items will be dearer; so that the figure named for Pig Iron will probably be a fair average, although that for 1901 has not been more than about \$15.50. As already stated, the immediate situation is not one that gives any anxiety to makers of Pig Iron, consequently there is a tacit understanding to let matters rest for the present. Basic Iron is urgently needed, however, and consumers are anxious to arrange for deliveries early in the new year, but there is none for sale in this vicinity, unless at prices which are considered to be totally out of sight. Prices are more or less nominal, but the extreme figures both ways would be about as follows for Philadelphia and nearby points: No. 1 X Foundry, \$16.25 to \$16.50; No. 2 X Foundry, \$15.75 to \$16.25; No. 2 Plain, \$15.35 to \$15.65; Standard Gray Forge, \$14.50 to \$14.75; Ordinary Gray Forge, \$13.75 to \$14; Basic (Chilled), about \$14.75 to \$15, and Bessemer, \$16 to \$16.50.

Billets.—Entirely nominal at from \$29 to \$30 for prompt shipments and about \$27 for long deliveries, but there is practically no Steel offering.

Muck Bars.—Business is a little quiet temporarily, with prices nominally at about \$27.50, f.o.b. cars sellers' mills.

Plates.—A very good business is reported in this department and mills are all actively employed, with excellent prospects for the coming year. Deliveries could be made with a fair degree of promptness, providing that the railways could furnish facilities for transportation, and prices would be about as follows for Philadelphia and nearby deliveries: Universals, 1.75c. to 1.80c.; Sheared, 1.75c. to 1.80c.; Flange, 1.85c. to 1.95c.; Fire Box, 1.95c. to 2.05c.; Marine, 1.95c. to 2.05c.; C. H. No. 1 Iron, 2.40c.; C. H. No. 2 Flange, 2.90c.; C. H. No. 1 Flange Fire Box, 3.40c.

Structural Material.—There is nothing to be said under this heading except to reiterate the reports of the past six months—viz., full of work, behind with deliveries and no immediate prospect of catching up. Nominal quotations are as follows for seaboard or nearby deliveries: Angles, 1.75c. to 1.85c.; Beams and Channels, 15-inch and upward, 1.75c. to 1.85c.

Bars.—There is a fair demand, but the mills are not rushed with orders and are in a position to make fairly quick deliveries. There is a good prospect for renewed activity after the first of the year, but the pooling arrangement among the mills is an effectual barrier to cutting in prices and to undue anxiety in regard to securing business. A meeting of the Eastern Bar Iron Association is to be held before the close of the week and it is not improbable that a slight advance in prices will be made. Meanwhile quotations are firm at 1.67c. to 1.72c., delivered, for Iron Bars; Steel at 1.70c. to 1.75c.

Sheets.—Business is very active, particularly for December and January shipments, but all the mills report great activity. Prices for deliveries during January and February in carload lots would be quoted about as follows: No. 10, 2.40c. to 2.50c.; No. 14, 2.60c.; Nos. 16 and 17, 3c.; Nos. 18-21, 3.10c.; Nos. 26, 27, 3.30c. to 3.40c.; No. 28, 3.50c.

Old Material.—Steel Scrap is scarce and dearer, other descriptions firm and unchanged. Bids and offers are about as follows for deliveries in buyers' yards: Low Phosphorus Scrap, \$22 to \$22.50; Choice Railroad Scrap, \$20 to \$21; Country Scrap, \$16 to \$17; No. 2 Light (Ordinary), \$12.50 to \$12.75; No. 2 Light (Forge), \$14 to \$14.75; Machinery Cast, \$14 to \$14.50; Heavy Steel, \$18 to \$18.25; Old Steel Rails, short lengths, \$18 to \$18.25; Old Iron Rails, \$21.50 to \$22; Wrought Turnings, \$12.75 to \$13.25; Cast Borings, \$8 to \$8.25; Old Car Wheels, \$16.75 to \$17.25; Iron Axles, \$24 to \$25; Steel Axles, \$19 to \$20.

December 19, 1901

Cincinnati.

FIFTH AND MAIN STS., December 18, 1901 (*By Telegraph*).

The strength of the Pig Iron market was never better evidenced than by the remarkable activity which developed during the past week. Not only was there a pretty general clearing out of all standard Irons for the next quarter's delivery, but odd lots, off grade assortments, and in fact everything weighing 16 ounces to the pound, and called Pig Iron, has been sold. At this writing there is a good tonnage in the way of inquiries which have gone the rounds and could not be filled. The selling prices have not been changed from the figures given a week ago, but it is a foregone conclusion that a rise of 50 cents will be called for within the next few days. The complaint regarding car shortage is as loud as it has been, and there is no prospect of any immediate betterment. Freight from Birmingham is \$2.75 to this point; from Hanging Rock district \$1.10. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1.....	to \$15.00
Southern Coke, No. 2.....	to 14.25
Southern Coke, No. 3.....	to 13.75
Southern Coke, No. 4.....	to 13.25
Southern Coke, No. 1 Soft.....	to 15.00
Southern Coke, No. 2 Soft.....	to 14.25
Southern Coke, Gray Forge.....	to 13.25
Southern Coke, Mottled.....	to 13.25
Ohio Silvery, No. 1.....	\$15.60 to 16.10
Ohio Silvery, No. 2.....	15.10 to 15.60
Lake Superior Coke, No. 1.....	to 16.60
Lake Superior Coke, No. 2.....	to 16.10
Lake Superior Coke, No. 3.....	to 15.60
Southern Basic.....	to 14.75

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, chilling grades.....	\$18.25 to \$18.75
Standard Southern Car Wheel, No. 2.....	17.25 to 17.75
Lake Superior Car Wheel and Malleable.....	18.50 to 19.00

Plates and Bars.—There is no change to quote in the general situation. Conditions are favorable for a fair winter's trade. Iron Bars have been placed on the same basis as Steel Bars, and are quoted f.o.b. Cincinnati as follows: Iron Bars in carload lots, 1.60c. to 1.65c., with half extras; same in small lots, 1.65c. to 1.80c., with full extras. Steel Bars are same price as Iron Bars. Base Angles, in carload lots, 1.90c.; Plates, $\frac{1}{4}$ -inch and heavier, 1.90c. to 2c.; 3-16 inch, 2.10c.; Sheets, No. 16, 2.90c. to 3c.

Old Material.—The market is steady and normal. We quote dealers' buying prices, f.o.b. Cincinnati, as follows: No. 1 Wrought Railroad Scrap, per net ton, \$14 to \$14.75; Cast Railroad and Machine Scrap, \$12.25 to \$12.75; Iron Axles, \$20 to \$20.50; Iron Rails, \$18.25 to \$18.50; Steel Rails, rolling mill lengths, \$14.75 to \$15.25; short lengths, \$13.75 to \$14; Car Wheels, \$16 to \$17. All prices except No. 1 Wrought on the basis of gross tons.

St. Louis.

CHEMICAL BUILDING, December 18, 1901.—(*By Telegraph*).

Pig Iron.—Considerable more activity is to be noted in the Pig Iron market for the past week than appeared earlier in the month, and the volume of inquiries and sales is pronounced to be very satisfactory. Some substantial orders have been negotiated in the market and several sales of 1000 tons were closed, making an aggregate tonnage in good round lots of perhaps 7000 tons. To this can be added numerous smaller requirements. Most of the smaller sales are for immediate delivery, while the larger ones are to come during the first three months of the new year. It is heard that the reason of some interests having now come into the market is for the purpose of covering immediate requirements on account of the inability of furnaces to promptly supply the Iron under contract. Rumors of advances to come in freight rates are still heard, but nothing definite can be announced. We quote as follows for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry.....	\$15.50 to \$15.75
Southern, No. 2 Foundry.....	14.75 to 15.00
Southern, No. 3 Foundry.....	14.25 to 14.50
Southern, No. 4 Foundry.....	13.75 to 14.00
No. 1 Soft.....	15.25 to 15.50
No. 2 Soft.....	14.75 to 15.25
Gray Forge.....	13.75 to 14.00

Bars.—The demand for Iron and Steel Bars continues good and strong, in keeping with recent conditions, and prices are unchanged. Jobbers continue to express

themselves as pleased with the volume of trade, it being above the average for this season of the year. We quote from mill: Iron Bars at 1.70c. to 1.80c.; Steel Bars at 2c. Jobbers quote Iron Bars at 2c. to 2.10c.; Steel at 2.10c. to 2.15c., full extras.

Rails and Track Supplies.—The same condition and feeling prevails in the Rail department of the market as was noted in our report of last week. Track Supplies are still in good call and prices are maintained on the same basis. We quote: Splice Bars, 1.75c. to 1.95c.; Bolts, with Square Nuts, 2.75c. to 2.90c.; with Hexagon Nuts, 2.90c. to 2.95c.; Spikes, 2c. to 2 $\frac{1}{2}$ c.

Angles and Channels.—The progress of the market for Small Angles and Channels is said to be very satisfactory, the demand keeping above the average, considering the lateness of the season. Jobbers quote at 2.30c., base, for materials of this class.

Sheets.—There is a quieter feeling in the market for Sheets, but prices hold firm. Jobbers quote Stove Pipe size, No. 27, 3.45c. to 3.50c.; Galvanized Sheets, 65 and 10 off, and in round lots, 70 to 70 and 5 off.

Pig Lead.—Announcement has just been made by the American Smelting & Refining Company of the reduction in the price of Desilverized. It is now quoted at 3.95c., f.o.b. St. Louis.

Spelter.—The market for the past week in Spelter has been less active, and prices hold well, around 4.12 $\frac{1}{2}$ c. to 4.15c.

The Missouri Lead producers are much dissatisfied with the new price of Desilverized, just announced, and it is said are refusing to meet the cut, preferring to merely fulfill requirements of old orders and hold off on the making of new contracts. A quotation on Soft Missouri of 4.10c. is heard, but 4.12 $\frac{1}{2}$ c. to 4.15c. better reflects the market. Chemical at 4.30c.

Cleveland.

CLEVELAND, OHIO, December 17, 1901.

Iron Ore.—The data have just been compiled showing the total movement of Iron Ore from the upper lake region to the lake receiving ports. The shipment for the year amounted to 20,149,669 tons, as against 18,570,310 tons during the season last year. This shows, therefore, an increase for this season of 1,579,359 tons moved by the lake route. The movement by the all rail routes has not been computed so far and the report will not be out until after the first of the year. This may bring the grand total up to 20,500,000. The movement of Ore after November 1, including naturally what was done during that month and so far in the month of December, amounted to 2,006,096 tons. In 1900 the movement from November 1 to the close of navigation amounted to 1,282,358 tons, an increase, therefore, for this year of 713,738 tons. The figures therefore indicate that almost half of the increase for the entire year came after November 1. The independent shippers took an unexpected action this week in selling a large quantity of Ore. Pickands, Mather & Co., the Cleveland Cliffs Iron Company and Corrigan, McKinney & Co. have sold to various independent furnaces, so called, in the Valleys 10,000,000 tons of Iron Ore, to be delivered 1,000,000 tons annually through the next decade. The prices at which these sales are reported to have been made are identical with those which have prevailed upon the market during the year—namely, \$4.25 for Bessemer and \$3 for non-Bessemer and Missabe. No other sales have been reported during the week. Some inquiry as to the possibilities of sales to the United States Steel Corporation produces the statement that this concern will not likely be on the market next year for any Iron Ore. During the present season the corporation shipped 2,000,000 tons of Ore produced from the so-called independent mines, but the explanatory statement is made that this amount of Ore had been contracted for by the companies constituent to the corporation before the major organization were formed. Most of these contracts expire with the close of navigation this year, although some few of them will carry over into next season. The corporation own

enough Ore to supply all of their needs on the basis of the present producing capacity of the furnaces controlled. It will be necessary to install some additional machinery in order to produce this Ore, but such is the announced intention of the corporation.

Pig Iron.—This week the market has heard of a sale of 10,000 tons of Basic Iron at \$15.25 in the Valleys, an increase, therefore, that puts Basic upon the same level as the Bessemer Iron and destroys the differential entirely that existed all year. The deliveries are specified for the first three months of 1902. As this sale indicates, there is a tremendous demand for Basic Iron, and the situation is not relieved in the least when it is said that the production is constantly curtailed to a very great extent by the absence of cars provoking a shortage of Coke. It is now made known that there are other heavy orders for Basic pending, which may be closed in a few days, and the aggregate tonnage is likely to be surprising. Some of the big buyers have come upon the market and want material badly. The Bessemer Association held a meeting in this city one day last week, but transacted only routine business. It was announced at the close that no questions of prices or of operation were discussed. The failure to take some decisive action upon the prices at which material shall be sold in the future is considered significant and the quotation which now prevails, of \$15.25 in the Valleys, will hold until further action is taken. Foundry producers are still holding on to their Iron and are inclined to get as much out of it as possible. The sales for quick shipment are now made at \$15.50 for No. 2 in the Valleys, with No. 1 at \$16, while on contracts the price ranges 50c. less upon the ton. Deliveries are very slow this week, because of the car shortage, which seems to be growing worse instead of the conditions improving any.

Finished Material.—This has been the banner week of the year. Adding to the long list of sales of the last few weeks of ship material, especially Plates, comes the announcement now that during the week just closed an order was placed for 10,000 tons of ship material—Plates and Structural Shapes. This has given the market an uncommon strength and has increased the hopes of the Steel producers. Aside from this there are inquiries for Sheared Plates that seem to indicate a continuance of healthy conditions. This week an order was also taken for 7500 tons of Open Hearth crop ends. In addition, also, the market shows a number of small sales of Rails of 200 tons and upward, aggregating quite a heavy tonnage. The Rail market is not quite as active as it was recently, the reason being that many of the railroads using steam power have about supplied their needs. The electric lines are still bidders upon the market, and there is a new steam line projected between Fairport, on the lake, and Pittsburgh which will soon be in the market, it is understood, for something like 50 miles of Rails. The Bar market is strong, reports to the contrary notwithstanding. Some rumors have been afloat during the last few days that some of the smaller mills have been able to make almost immediate delivery since they are short of orders. The situation as far as the occupation of the mills is correct, but it seems that the smaller concerns are dependent upon the larger ones for their Steel, which commodity is not forthcoming. The Bar market, as a whole, is very strong, and this situation is one which has given a tone of broad optimism to the general trade. Few now are offering deliveries short of five or six weeks. The Sheet market is still active, with deliveries from the mills coming a little slow. On No. 27 gauge the dealers here are quoting from 3.10c. to 3.20c. on carload lots from the mills, subject to the usual extras for less than carload lots. The demand for the material out of store continues, with stocks more or less broken into. The quotations are as follows: No. 10, 2.35c. to 2.50c.; No. 12, 2.45c. to 2.60c.; No. 14, 2.55c. to 2.70c.; No. 16, 2.95c. to 3.10c.; No. 18, 3c. to 3.15c.; No. 20, 3.05c. to 3.20c.; Nos. 22-24, 3.15c. to 3.50c.; Nos. 25, 26, 3.25c. to 3.40c.; No. 27, 3.35c. to 3.50c.; No. 28, 3.45c. to 3.60c. One-tenth extra is charged for full cold rolled. Billets are still off the market entirely and no quotation is even made at this time, although it

is known that should any material show up the holder thereof might be able to command his price.

Old Iron.—The market is moving along quietly and, contrary to expectations, has not reflected in any large measure the boom that there is now on Pig Iron. Still it might be said that the market is a little stronger, as is instanced by the fact that Heavy Steel, Busheling Scrap and Borings are in good demand, whereas recently there was no market whatever. The demand for Cast Scrap has not kept the pace which was expected of it. Prices continue as follows: No. 1 Wrought, \$16.50 net; Cast Borings, \$8 gross; Wrought Turnings, \$12.25 gross; Cast Scrap, \$13 net; Stove Plate, \$10 net; Heavy Steel, \$17 gross; Steel Rails, \$17 gross; Old Iron Rails, \$22 gross; Old Iron Axles, \$19 gross; Old Car Wheels, \$17 gross.

Birmingham.

BIRMINGHAM, ALA., December 16, 1901.

The past week in the Iron market was simply a continuance of the conditions heretofore reported. The hardening of the market to which these letters have of late called attention was more perceptible, inasmuch as 25c. per ton advance was obtained on small lots. The truth is an advance of 25c. per ton, or even 50c. per ton, could easily be obtained for the asking. And the time is pretty close at hand when it will be asked. The furnace interests, as has been stated, would be glad to see an easing up in the demand so their business could be adjusted and the relations of sales and deliveries harmonized. As it is, in the furnace yards Iron is continuing to be stacked to await that convenient season when the railroads can furnish cars for its transportation. As it is, the prospect of amelioration in this respect, so hopeful a short time back, proved to be "a will o' the wisp," and the conditions are as bad as ever, and they are likely to continue without improvement until the cotton movement is nearing its end. The fact is business has developed faster than the facilities for moving it promptly, as was predicted in these letters two years or more ago would be the case. There is no help in sight yet to remedy the evil. Quotations are yet on the basis of \$11.50 for No. 2 Foundry, which makes No. 1 Foundry \$12.50. Nos. 1 and 2 Soft are \$12.50 and \$11.50, while Gray Forge and No. 4 Foundry are each \$10.50. There continues to be an absence of orders for important round lots, but there is a continuous stream of medium and small size orders which more than tax ability to supply. A prominent official in a leading interest, in reply to the question, "For what character of Iron is the demand?" said: "For all grades, from Gray Forge to Silver Gray." One large interest is completely out of the market on Mill Iron, their output being inadequate to their requirements in the Mill grades. Deliveries are widening, and sales have of late materially increased, covering requirements for the whole of 1902. For the second half of 1902 the orders have perceptibly increased. And yet while this is true there is no great big business being done. Our conditions do not permit it, and sellers are conservative in their action, influenced by the fear that a market advance would bring increased cost of production. They have, heretofore, held the bag on a boom market and marked up deliveries to themselves that buyers rejected when market conditions were unfavorable. Their greed, therefore, is limited to only a fair business profit.

Some new companies have been incorporated, notably the Abernaut Coal Company and the Ensley Investment Company. Reports are in circulation favorable to the successful mining of Brown Ore at Leeds, and of the favorable impression made on examining experts by certain Coal properties on which Eastern capital holds options.

The projectors of the shipbuilding plant at Mobile have visited the locality to complete plans for its erection. A commencement of operations is in sight. In the successful accomplishment of these plans this district is vitally interested. Metaphorically speaking, it would extend the borders of Birmingham to Mobile.

In the northern part of the State a railroad piercing

a mineral region in Alabama, Tennessee and Kentucky is projected, and the capital, \$7,000,000, necessary to build it is guaranteed by Eastern financiers. Early in January the survey of the road will commence, to be followed by activity in its building. We are on the eve of big things, and we can gratefully and truthfully say that we are "favored by heaven, o'er all the world beside."

Pittsburgh.

HAMILTON BUILDING, December 18, 1901.—(By Telegraph.)

Pig Iron.—The Bessemer Iron market is extremely active, and heavy sales have been made for delivery in first and second quarters of next year at \$15.50 to \$15.75, at Valley furnace, while small lots for prompt shipment have sold up to \$16, at furnace. The absolute minimum of the Bessemer Iron market to-day is \$15.75, at Valley furnace, and 25,000 to 30,000 tons have been sold for the second quarter at this price. The car situation this week seems to be worse than at any time since the car shortage started, and quite a few furnaces in both Valleys and in other districts as well are banked, unable to get Coke. This is adding to the scarcity of Pig Iron, and it looks as though prices might be higher. There have been heavy sales of Basic Iron for first and second quarters at \$15 to \$15.25, at furnace, one Steel interest having bought about 25,000 tons. There is also a scarcity of Forge Iron, and the market is \$14.75 to \$15, at Valley furnace, and \$15.25 to \$15.50, Pittsburgh. Foundry Iron is also active, and some consumers have practically covered their entire requirements for first half of next year. We quote Bessemer Iron at \$15.75 to \$16, at furnace, or \$16.50 to \$16.75, Pittsburgh. Forge is \$15.25 to \$15.50. No. 1 Foundry, \$16.50 to \$16.75, and No. 2, \$16 to \$16.25, all f.o.b. Pittsburgh. We note sales of 25,000 to 30,000 tons of Bessemer Iron for the first and second quarters at \$15.50 to \$15.75, at furnace; 2000 tons of Gray Forge at \$15.25, Pittsburgh, and about 3000 tons of No. 2 at \$16 to \$16.25, Pittsburgh.

Steel.—Steel continues scarce, and the market is firm, but there is not much inquiry. Small lots of Billets for Eastern shipments have been sold on the basis of \$27.50, Pittsburgh. The market on small lots of Steel for prompt shipment is from \$27 to \$28, maker's mill, the price being governed by the order and deliveries wanted. Sheet Bars for prompt delivery are held at \$28 to \$29. It is understood that there have been some recent importations of both Billets and Sheet Bars, and negotiations for further lots are under way.

(By Mail.)

Operations at the mills located along the Monongahela and Allegheny rivers have been very seriously interfered with in the last few days, first by a flood, which caused many of the plants to close down tight, and then by a blizzard, which kept them idle for several days longer. Some of the works are still idle and may not get started before the last of this week. This, coming at a time when material is so badly needed, makes it much worse and is doubly expensive to the mills. The switchmen's strike, which has also interfered more or less with operations at many plants, notably those located along the Allegheny Valley Railway, has been declared off. The principal item of interest in the Iron trade this week is the heavy purchases of Bessemer and Basic Iron by the Steel companies for delivery in first quarter and first half of next year. One Steel concern has bought a round block of Bessemer Iron for the second quarter, while another consumer has bought quite a heavy tonnage of Chilled Basic Iron for first quarter. We also note large sales of Forge and Foundry Iron for next year at high prices, and the Pig Iron market is about as strong as it possibly could be. In Billets, a moderate amount of tonnage is being sold, but mostly in small lots for prompt delivery. Prices of Steel are so high that the trade are buying very cautiously until it is determined whether present values can be held. There is nothing of special interest to note in Finished Iron and Steel. This is usually the dullest month in the year in the Iron trade, but tonnage is holding up remarkably well, and is almost as heavy as in September and Octo-

ber, when demand was exorbitant. It would seem that with the heavy tonnage on the books of the mills the situation for first half of the year is assured.

Ferromanganese.—We continue to quote Domestic 80 per cent. Ferro at \$52.50 to \$53.50, depending on the order, delivered at buyer's works. Foreign can be bought at \$50 a ton.

Muck Bar.—The market is somewhat quiet. We quote standard grades at \$29 to \$29.25 delivered. Eastern Muck Bar is offered at lower prices in this market.

Rails.—No large contracts have been placed since the Baltimore & Ohio order of 55,000 tons. The Rail mills now have over 1,400,000 tons of new orders on their books for 1902 delivery. Nearly 300,000 tons will be carried over from this year. We quote at \$28, at mill.

Spelter.—There is not much buying. We quote Prime Western grades at 4.15c., Pittsburgh.

Rods.—The market is quiet and prices are lower than for some time. We quote Bessemer Rods at \$32.25 to \$32.50, Pittsburgh.

Structural Material.—Building continues very active all over the country, and a large tonnage in Shapes is being placed with the mills right along. Two proposed office buildings in this city, if put through, will take about 10,000 tons. Bridge shops are very busy and are placing large orders for Material. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inches, 1.60c.; smaller sizes, 1.55c to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c. All above prices are f.o.b. Pittsburgh. Small lots of Beams and Channels for prompt shipment bring from 10c. to 25c. per 100 pounds higher prices than the above.

Plates.—Several of the leading mills advise us that tonnage in Plates has picked up very materially in the past week, or since it became known by the trade that the Plate agreement had been renewed. Steel car shops and the boat yards have already placed heavy contracts and will give out additional large tonnage after the first of the year. We are advised that established prices are being firmly held, both by the mills in the agreement and those outside. We quote: Tank Plate, $\frac{1}{4}$ -inch thick and thicker, up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, \$2 extra; gauges Nos. 7 and 8, \$3 extra; No. 9, \$5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Sheets.—There is still some difficulty in getting prompt deliveries of Sheets, and the independent mills coming in the market have been able to sell up their product for 60 days or longer. However, some Sheet mills are actively soliciting orders for delivery in March and later. A good many mills are booking contracts for Sheets, prices to be those in force by the leading Sheet interest at the time deliveries on these contracts are made. We quote Black Sheets, Box Annealed, one pass through cold rolls, as follows: Nos. 10, 11 and 12, 2.40c.; Nos. 14 and 15, 2.50c.; Nos. 16 and 17, 2.60c.; Nos. 18 to 21, inclusive, 2.70c.; Nos. 22, 23 and 24, 2.80c.; Nos. 25 and 26, 2.90c.; No. 27, 3c.; No. 28, 3.10c.; No. 29, 3.25c.; No. 30, 3.35c. For good orders Sheets can be bought on the basis of 2.80c. for No. 26, 2.90c. for No. 27 and 3c. for No. 28. Small lots of Sheets bring about 3.10c. for No. 27 and 3.15c. for No. 28. We quote Galvanized Sheets at 70 and 5 off in carloads and 70 off in small lots, maker's mill.

Iron and Steel Bars.—Tonnage in both Iron and Steel Bars has fallen off very materially, as it always does in December, and unless demand picks up soon, some of the larger interests may have to close a few of their mills. It is believed, however, that demand will improve after the first of the year, when inventory and repairs have been completed. We quote Steel Bars at 1.50c. at mill, half extras, with \$2 a ton advance for Open Hearth stock and the usual advances for special shapes. We

quote Iron Bars at 1.55c., Pittsburgh, for Eastern shipment and 1.50c. for Western shipment.

Merchant Steel.—Only a fair amount of new tonnage is being placed, but the mills are busy on old contracts, buyers specifying against these very liberally. In fact, the mills are pretty comfortably filled for the next 60 or 90 days. We quote: Tire Steel, best quality, 1.70c.; Toe Calk, 1.80c. to 1.85c.; Hammered Lay Steel, 3.50c.; Open Hearth Spring, 2.50c. to 2.75c.; Steel Bars, 1.50c., base, in carloads, and 1.60c. in small lots; ordinary Plow Slabs up to 6 inches wide, 2.25c.; over 6 inches wide, 2.40c. For ordinary orders we quote Cold Rolled and Cold Drawn Shafting at 60 per cent. off in carloads and 55 per cent. off in less than carloads, delivered at all points east of the Mississippi River. We quote Tool Steel at 6c. and upward, depending on quality.

Skelp.—There is not much buying, and the market continues quiet. It is thought demand will improve after the first of the year. We quote Grooved Iron Skelp at 1.75c. and Sheared 1.80c. to 1.85c. Grooved and Sheared Steel Skelp is quoted at 1.75c. to 1.80c., depending on the order and sizes. These prices are f.o.b. maker's mill, less 2 per cent. for cash in 30 days from date of shipment.

Boiler Tubes.—Demand continues very active, and the mills are filled up for the next two or three months or longer. Prices are unchanged, and to consumers are as follows:

	Boiler Tubes.	Up to 22 feet.	Per cent.
Steel.			
1 inch to 1½ inch and 2½ inch to 5 inch, inclusive...	65½		
2 inch to 2½ inch, inclusive.....	60		
6 inch and larger.....	59		
Iron.			
1 inch to 1½ inch and 2½ inch.....	43½		
1½ to 2½ inch.....	43		
2½ to 13 inch.....	53		

Iron and Steel Scrap.—Nothing tangible has yet come of the movement under way by consumers of Scrap to form an agreement to control prices. A fair amount of Scrap is being sold, and prices are firm. Old Steel Rails and Heavy Melting Stock are in particularly active demand. We quote: No. 1 Wrought Scrap, \$16.50 to \$17 net ton; Iron Rails, \$21 to \$22 gross ton. Heavy Melting Stock, \$17 to \$17.50 gross ton. Low Phosphorus Melting Stock, \$18.50 to \$19 gross ton. Old Steel Rails, \$17 to \$17.50 gross ton.

Merchant Pipe.—The volume of business is fairly satisfactory for this season of the year, but has fallen off very much from September and October. On attractive orders prices are being shaded by the outside mills. To consumers in carloads we quote as follows:

	Merchant Pipe.	Per cent.	Per cent.	
			Black.	Galvd.
1½ to 2½ inch and 11 to 12 inch.....	61	48		
¾ to 10 inch.....	68½	56		
<i>Casing, Random Lengths.</i>				
	S. & S.	I. J.		
2 to 3 inch.....	58	53½		
3½ to 4 inch.....	63	59		
4½ to 12½ inch.....	65	61½		
<i>Casing, Cut Lengths.</i>				
	S. & S.	I. J.		
2 to 3 inch.....	53½	59		
3½ to 4 inch.....	59	55		
4½ to 12½ inch.....	61½	57½		

Connellsville Coke.—Of the 21,833 ovens in the Connellsville region, 19,963 were active last week and 1870 idle, the output having been 236,737 tons, and shipments 9449 cars. Strictly Connellsville Furnace Coke is quoted at \$2.10 to \$2.25 a ton at oven, and it is stated numerous contracts for first half of next year have been made at these figures; 72-hour Foundry Coke is \$2.35 to \$2.50 a ton. Main Line Furnace Coke is held at \$1.75 to \$1.90, depending on the brand, and Foundry at \$2.10 to \$2.25 a ton, at oven. The Coke trade for this year will break all previous records, both in the matter of tonnage and profits made by the operators. Wages all through the year were higher than ever before, and are not likely to be disturbed during the first half of 1902 at least. Recent heavy rains have assured an ample supply of water in the Coke region for a long time, and the closing of lake navigation has diverted to the Coke trade hundreds of cars formerly used for the hauling of Ore and Coal, and the car situation is very much improved.

The blast furnaces of the Siegen district, in Germany, have decided to cut down production 50 per cent.

New York.

NEW YORK, December 18, 1901.

Pig Iron.—A good many consumers have now purchased well into next year, some of them up to August. The reports from the Lehigh Valley indicate that the floods have very seriously delayed work, and it looks as though there will be a good deal of trouble in the near future with the supply of blast furnace Anthracite. We quote: No. 1, \$16.35 to \$17.50; No. 2 X, \$15.75 to \$16; No. 2 Plain, \$15.25 to \$16; Gray Forge, \$14.65; Tennessee and Alabama brands, No. 1 Foundry, \$16; No. 2 Foundry, \$15.25; No. 1 Soft, \$16; No. 2 Soft, \$15.25; No. 3 Foundry, \$14.75; No. 4 Foundry, \$14.25; Gray Forge, \$14.25.

Cast Iron Pipe.—Quite a number of moderate sized orders for New England delivery have been placed, among them one lot of about 900 gross for Providence. Philadelphia is to let to-day a contract for the filtration plant, which will involve about 8000 to 10,000 tons of Pipe. Baltimore is also in the market for Pipe. It is noted that inquiries for next spring are coming in in a lively fashion and that options are promptly taken.

Steel Rails.—Some important business is coming up in Mexico in connection with the widening of the gauge of the National road. It is estimated that about 130,000 tons will be required.

Finished Iron and Steel.—Current business, notably for heavier Structural Steel, continues quite large. We note the placing of a contract for a building on Longacre Square, which, with Cast Iron Columns, will call for 8000 tons of material. Prices are quoted as follows at tidewater: Beams, Channels and Zees, 1.75c. to 1.80c.; Angles, 1.75c. to 1.80c.; Tees, 1.80c. to 1.85c.; Bulb Angles and Deck Beams, 2c.; Sheared Steel Plates are 1.80c. to 1.85c. for Tank, 1.90c. to 1.95c. for Flange, 2c. to 2.05c. for Fire Box. Charcoal Iron Plates are held at 2.40c. for C. H. No. 1, 2.90c. for Flange, and 3.40c. for Fire Box. Refined Bars are 1.65c.; Soft Steel Bars, 1.70c.

Metal Market.

NEW YORK, December 18, 1901.

Owing to the acute developments of the week in the cutting of prices of Copper and Lead the entire market has been completely demoralized. Although purchasing has been made on a very conservative basis for some time now, consumers are more wary than ever. They are also considerably exercised over the cut in Lead which, though a decline was expected, is much greater than looked for. Many consumers were caught with a pretty fair amount of stock going through their works. In disposing of the finished product considerable difficulty is expected.

Pig Tin.—Business is exceedingly dull, with prices gradually declining. Arrivals are now coming more freely, and by the middle of next week they will foot up to about 2400 tons. This is considered ample to meet requirements at this time of the year. The afloats which are expected to arrive in January amount to more than 3000 tons. All this goes to show that the country will doubtless be well supplied for December and January. The Billeton sale, which was held at Batavia to-day, went at the equivalent of £106 c.i.f., Holland. During the last week prices have sagged to: Spot, 24c. to 24½c.; December, 24½c. offered; January, 24c. offered; February, 23½c. offered; March, 23.20c. offered, and 22½c. bid. London was quoted to-day £107 10s. for spot and £103 10s. for futures.

Copper.—Prices have commenced to drop. Two sensational declines of 1½c. each were made during the week under review. On Friday last the first "official" cut in price was made. The United Metals Selling Company announced a decline of 1½c., quoting Lake, 15½c. to 15½c.; Electrolytic, 15c. to 15½c., and Casting, 15c. To-day another "official" cut was made to 14c. for Lake, 13½c. for Electrolytic and 13c. for Casting. In the trade this is viewed as the "beginning of the end." Any talk of increased buying on account of the cut is absurd. As a matter of fact, consumers are more reluctant than ever. They hold that nothing can now

prevent prices toppling at least to 12c. As one consumer put it, "The card house has commenced to fall and we are all keeping our distance." Quite naturally, the "outside" producers are selling below the new quotation. Before the cut of to-day was made to that figure it was reported in the trade that Lake could be obtained at 15c. and Electrolytic at 14½c. Even these prices were only for the smallest retail lots, for such is the only business transacted. The new prices have only served in unsettling the market to a still further extent. The London market has continued in its wild decline. Spot sold as low as £50 and futures touched £49 10s. The closing prices to-day were £50 for both spot and futures. A very sharp decline was cabled to-day from London for Best Selected. The cable this morning quoted a drop of £4 10s., making the price £64 for spot. This is equal to 13.43c. in London.

Pig Lead.—An announcement of a cut of ¾c. yesterday startled the trade. The American Smelting & Refining Company made the cut by quoting 4c. flat for Desilverized, New York, and 3.95c., St. Louis. A decline was generally expected in the trade, but no one looked for so wide a slash as was made. It is said that many large consumers were caught. The cut followed the meeting of the American Smelting & Refining Company and the miners. An agreement was reached with those present, which represented about 80 per cent. of the principal warring interests. The miners agreed to close down their works whenever so ordered by the Smelting Company, and contracts were made on a basis of 3.50c. London has continued to decline, coming to-day £10 7s. 6d. This is about equivalent to 2.30c., New York, minus the duty.

Spelter. While unchanged as to quotations, is seriously affected by the unsettled condition of other metals. Business is practically at a standstill. The metal is nominally quoted at 4.45c. in store. As there is nothing in store, however, 4.35c. is quoted for Spelter in transit. St. Louis is unchanged at 4.17½c. London closed to-day at £17.

Antimony.—Hallett's has declined to 8¼c. Cookson's is unchanged, being held nominally at 10¼c. Outside brands declined to 8c.

Nickel.—Is unchanged, prices continuing on a basis of 60c. for lots not covered by yearly contract.

Quicksilver.—There is no change here. The price is \$51 per flask of 7½ lbs., in lots of 50 flasks and more. London has declined 2 shillings 6 pence, to £8 17s. 6d.

Tin Plates.—The situation is unchanged. The American Tin Plate Company are selling only for the first quarter of next year on a basis of \$4.19 per box of standard 100-lb. Cokes, f.o.b. New York, and \$4 f.o.b. mills. London has declined slightly to 12 shillings 9 pence.

John Stanton reports the copper production in the United States and of the foreign reporting mines and United States exports as follows, in gross tons of 2240 lbs.:

	Product			
	Reporting mines.	Outside sources.	Total U.S. foreign product.	
			U. S. mines.	exports.
First half 1895....	70,612	9,100	79,712	42,484 34,215
Second half 1895....	84,885	6,600	91,485	43,674 30,507
Total 1895.....	155,497	15,700	171,197	86,178 64,722
First half 1896....	94,180	7,200	101,380	42,255 58,216
Second half 1896....	95,314	7,200	102,514	43,941 67,287
Total 1896.....	199,494	14,400	203,894	86,196 125,503
First half 1897....	103,651	5,000	108,651	44,263 64,870
Second half 1897....	100,555	6,900	107,455	44,007 64,340
Total 1897.....	204,206	11,900	216,106	88,270 129,210
First half 1898....	112,687	7,800	120,487	40,880 68,284
Second half 1898....	103,535	10,250	113,785	43,674 76,183
Total 1898.....	216,222	18,050	234,272	84,554 145,115
First half 1899....	111,987	12,500	124,487	43,629 56,460
Second half 1899....	118,818	18,900	137,719	45,611 63,351
Total 1899.....	230,806	31,400	262,206	89,240 119,811
First half 1900....	114,177	20,400	134,577	43,153 90,747
Second half 1900....	113,810	20,400	134,104	46,278 69,535
Total 1900.....	227,987	40,800	268,681	89,481 160,082
First half 1901....	112,794	20,600	133,394	46,847 50,027
July, 1901.....	18,555	3,400	21,985	9,254 6,824
August, 1901.....	19,267	3,400	22,667	8,180 6,840
September, 1901....	18,080	3,500	21,580	9,477 6,419
October, 1901....	20,498	3,600	24,098	8,960 8,016
November, 1901....	18,128	3,600	21,728	8,846 6,069

Reports are to the effect that beginning on January 1 the German Coke syndicate will cut down production to 40 per cent. of normal output.

No Change in Brass Prices.

At a special meeting of the principal Brass producers of the country, held in New York on Tuesday last, it was decided not to change the price of Brass. All of the important mills of the Naugatuck Valley and the West were represented. Action on this subject became necessary in order to prevent demoralization in the Brass market as a result of the cut in the price of Copper. As the price of Brass has been correspondingly low for some time, not having been advanced in proportion to the advances made in Copper, a decline at this time was considered impossible. It was argued that the margin of profit is very low as it is, and for that reason a cut to correspond with the decline in the price of Copper is unwarranted.

Prices of Copper Wire have been cut in sympathy with the decline in Copper.

Iron and Industrial Stocks.

The week has been one of fair steadiness, Colorado Fuel & Iron, however, suffering a sharp drop on Thursday last as the result of a report of dissensions between the Gates and Osgood parties, the stock declining to 77. An authoritative denial, however, brought a recovery and the stock has since been selling at 87 to 88. Diamond State Steel declined on the passing of the dividend from 2 to 1½%. Pressed Steel, too, fell off as the result of threatened competition. On the whole the volume of business is small and the outside interest light.

At a meeting of the directors of the Diamond State Steel Company on December 14 it was decided to pass the regular dividend on the preferred stock.

Dividends.—The American Iron & Steel Mfg. Company have declared a quarterly dividend of 1¼ per cent. on their preferred stock, payable January 1 to stock of record December 24; a dividend of 15 cents per share also has been declared on the common stock, payable January 29 to stock of record January 22.

The George A. Fuller Company have declared a dividend of 1¾ per cent. on the preferred stock, payable January 1, to stockholders of record December 21.

The regular semiannual dividend of 3 per cent. will be paid on the preferred stock of the Alabama Steel & Shipbuilding Company guaranteed by the Tennessee Coal, Iron & Railroad Company.

The International Silver Company have declared a dividend of 1 per cent. on preferred stock, payable January 1. Books close December 20; reopen January 2.

The United States Projectile Company have declared their regular quarterly dividend of 2 per cent., and an extra dividend of 2 per cent., payable January 1. Books close December 26 and reopen January 2.

The Stokes Bros. Mfg. Company of Freehold, N. J., have declared a semiannual dividend of 15 per cent., payable December 20.

The American Smelting & Refining Company have declared the regular quarterly dividend of 1¾ per cent. on their preferred stock, payable January 14. Books close December 24 and reopen January 15.

The Standard Coupler Company have declared a semi-annual dividend of 4 per cent. on their preferred stock and a dividend of 1 per cent. on their common stock, both payable December 31. Books close December 21 and reopen January 15.

The People's Natural Gas & Pipe Company of Pittsburgh have declared a quarterly dividend of 2 per cent., which places this stock on an 8 per cent. basis. Heretofore, dividends have been 4 per cent. annually.

The Crucible Steel Company of America have declared dividend No. 5 of 1¼ per cent. on the preferred stock, payable December 30.

The directors of the Westinghouse Company of Pittsburgh have declared the regular quarterly dividend of 1½ per cent. for both the common and preferred stocks, payable January 15 next.

The directors of the Westinghouse Air Brake Company of Pittsburgh have declared the customary quarterly dividend of 2½ per cent. and 3½ per cent. extra.

payable January 10. This is the sixth consecutive quarterly dividend of 6 per cent. paid by that company, the one for October, 1900, having been 7½ per cent.

Trade Publication.

Cooling Towers.—The Victor Cooling Tower Company of St. Louis, Mo., describe their cooling towers in Catalogue No. 11. The success of this construction is due to the fact that it has met the growing demand of engineers for an efficient and compact water cooling apparatus, simple in construction, easy to operate and to keep clean, and at the same time light enough to permit its being placed on the roof of a building. This tower is very light in proportion to its capacity, and the interior is constructed in sections which may be easily removed, making it easy of access for cleaning and repainting the interior walls of the shell. The interior is made of metal plates, so perforated as to form ledges over which the water flows very slowly. These plates are set at a slight angle with the vertical, and are so arranged that the water after passing over one is delivered to the top edge of the plate below. The plates are placed in a zig zag fashion, which prevents the water from flowing to one side of the tower, as would be the case if the plates all sloped in the same direction. The air, too, is thus given a perfectly free passage in an opposite direction from the flow of water. The efficiency of the apparatus is largely due to the fact that the water to be cooled is evenly distributed, and does not pass from the tower in streaks, but covers the plates in a uniform thin film, thus presenting a large water surface to the upward current of air. The air causes a portion of the water to evaporate, and the heat which is necessary to change this water into vapor is taken from the unevaporated water and carried out of the tower by the vapor in the form of latent heat. The unevaporated water thus becomes colder.

A New Westinghouse Company.—The Westinghouse interests in London have formed a new company with a capital of £1,100,000, or about \$5,500,000. They are to be known as the Traction & Power Securities Company, Limited, and are to be in line with the Westinghouse, Church, Kerr & Co. partnership in this city, whose principal business is electrical engineering, though they also handle much of the security and agency business of the Westinghouse concerns in Pittsburgh. A prime object of the new company is to receive payment in debenture securities and pay cash to the producing interest. Urgency for the formation of the company arose through a contract of the British Westinghouse Company, who are also large shareholders with the Mersey Railway Company, for the equipment of the line. H. S. Loud, manager of the British Westinghouse Company, is now in Pittsburgh preparing special machines and patterns for use in the works at Manchester.

The East Florida Ice Company are to build an ice plant at Jacksonville, Fla., with a capacity of 150 tons per day. The equipment has been purchased. Communications should be addressed to Robt. Gambler, Tallahassee.

The Electric Mfg. Specialty Company have been incorporated for the manufacture of small motors and other electrical appliances. They have an experimental shop at 101 Beekman street, but soon expect to move into larger quarters. H. O. Swoboda is president.

The Newark Tube & Metal Works have secured the building at 24 Johnson street, Newark, N. J., and are fitting it up preparatory to going into the manufacture of umbrella rods and small metal novelties. They are building their own machinery.

The officers of the Eastman Lumber Company of Macon, Ga., contemplate the erection of a brick plant at Port Vincent, La.

Cincinnati Machinery Market.

The latest contestant for honors in machine tool circles is the Wals-King Tool Company, who will shortly engage in the manufacture of boring machinery. Mr. Christ. Wais, so long identified with the Wais & Roos Punch & Shear Company, is at the head of the new concern, and they are at present erecting a commodious building for the accommodation of their plant at Winton Place Station, a few miles outside of Cincinnati proper. They are understood to be contracting for shop equipments.

The Lane & Bodley Company report recent shipments and orders of considerable magnitude for points in Australia, and say that they have had some orders for very heavy engines for cement works and rolling mills at domestic points. One of the largest engines they have made in some time is now being set up in their shops preparatory to shipment to the Newport Rolling Mill. The machine is certainly a ponderous one, the bed itself weighing 20 tons in one casting. The fly wheel weighs 70 tons; the cylinder is 38 x 72 inches.

The William Powell Company, makers of brass and iron fittings and steam supplies, are again enlarging their plant, this being the second addition they have made to it during the present year. The new building is 50 x 35 feet, and three-stories high, and adjoins the plant in the rear. The latest departure in manufacturing which this company have entered into is that of injectors. They are just getting out their patterns, and expect to be active competitors in that line from now on.

The S. Obermayer Company, makers of foundry facings and supplies, report a very good year in foundry circles. They say that an unusually large number of foundries have been equipped and started on business careers. These new concerns appear pretty well scattered over the entire country, and among them were three large plants erected by the United States Government, for each of which the company secured large contracts. The export business has been fully double that of 1900, with customers in almost every country in which iron is made and sold.

The Lunkenheimer Company, makers of steam fitters' and brass and iron steam supplies, are well along in the construction of their main building at Fairmount, this city. The size of the building is 190 x 375 feet, to be four stories and basement when completed. Owing to the fact that they have been badly delayed in securing structural material, the delay being largely occasioned by the steel strike, they will not be able to complete the structure before next spring, and will hardly be in their new quarters before June 1, 1902.

Cincinnati Machine Tool Company are having an excellent success with the new patent gear tapping attachment which they are applying to all of their drills. They are also arranging all of their machines with geared revolving tables when customers so desire. They are now at work upon a new catalogue, which they expect to bring out very early in the next year.

The Carnegie Steel Company have sold to the Philadelphia Company their natural gas business in the borough of Munhall, where the Homestead Steel Works are located, for a consideration said to be \$100,000. The Carnegie Steel Company furnished the citizens of Munhall borough natural gas at the low rate of 10 cents per 1000 feet, but it is probable that the Philadelphia Company will charge the regular rate of 25 cents a 1000 feet.

The American Can Company of New York City are enlarging their Empire works at Geneva, N. Y., by the erection of an addition, 100 x 150 feet, and a new power house, 40 x 50 feet, which will be equipped with a new Corliss engine and boiler of 100 horse-power capacity. The capacity of the plant will be increased to 75,000,000 cans per year.

The Belfast Can Company, Belfast, N. Y., have been incorporated to manufacture tin cans and other tin specialties. They are now equipping a plant with new machinery. I. S. Hunt is president.

The New York Machinery Market.

NEW YORK, December 18, 1901.

When consideration is given the fact that this is the last fortnight of the year the existing conditions in the machinery trade cannot be regarded otherwise than as remarkable. Instead of falling behind in business, as is usually the case, December has held right up to the mark and will, according to all present indications, show up better than last month. While no orders of startling size have been closed during the week under review, regular business has been particularly active. A good general demand exists in all lines.

Inquiry is excellent. It is not expected, however, that present inquiry will terminate in business before the new year. Some of the correspondence states emphatically that goods are not wanted prior to January or February. One reason for this postponement of purchases is that the large structural steel concerns are so busy that the new buildings are not rising as rapidly as was expected. We hear of one concern who expect to install a nice lot of machinery in a new plant who are waiting simply for the erection of their buildings. They should have been completed according to contract months ago. Other similar causes are delaying large purchases of machinery. The inquiries that have been received during the last week or two are regarded in the trade as very promising.

In connection with export trade one very interesting feature is the return to this country of A. M. Fisher. About five years ago Mr. Fisher went to the Far East and connected himself with F. W. Horne. Later on he became a partner in the firm of Stone, Fisher & Co. of Yokohama. While in Japan he made many good business connections in this country and sold considerable American machinery. His chief difficulty, however, was in securing the necessary data relative to American machinery from manufacturers here. He decided to come to this country and attend to this end of the business himself. Accordingly he arrived about two weeks ago and has connected himself with the firm of Browne & Frothingham of 32 Broadway, N. Y., who make a specialty of selling machine tools for export. His plan is to place his foreign connections and experience in the Far East at the disposal of all American machinery builders. Mr. Fisher states that he is not desirous of obtaining exclusive agencies. He simply wants a chance to sell the machinery and the help of the American manufacturers in the shape of catalogues, weights, dimensions, prices, &c. His plan is entirely a novel one and is meeting with the approval of prominent machinery builders.

In speaking of conditions in Japan, Mr. Fisher said: "The financial situation is not especially strong at this time, and consequently the Japanese are not purchasing as freely as they would like to. This is, however, a good time for the development of the field. The Japanese are very enterprising, and when the country is again placed on a good financial footing it will be the American machinery that has had a previous introduction that will find the sale. When a manufacturer there learns to like a certain appliance or machine it is a very hard matter and almost an impossibility to get him to abandon it for a new or unknown article. Before he adopts anything new he must be satisfied as regards to numerous infinitesimal points. As an illustration I might cite an instance that came up just before I left. A 30-inch gear cutting machine was sold to a very enterprising firm. The machine was of a very well known American make and for cutting gangs of small gears on a long mandrel it had an overhanging arm or support. As this was intended only for small gears it did not, of course, admit a 30-inch nut, which is considered sufficiently large and rigid to hold without a support. I tried to explain this to the natives, but the purchaser could not see through it, and simply said, 'prove it by the catalogue.' The catalogue just happened to omit explanation of that point in detail, and it was necessary for me to receive an explanatory letter from the American builders before he accepted the explanation. As soon as he was convinced he accepted the machine, and has had

very good results, and has made extensive purchases of cutters, &c., since.

"Shortly before I left Japan the most interesting topic in manufacturing circles was the opening of the steel works at Moji. The official opening was held last month after a delay since April. The plant consists of three parts, the Bessemer, open hearth and foundry departments. There is also a rail mill and a mill for rolling merchant bars and structural shapes. The plant, as now erected, is only one-third of the intended size. The principal equipment is German, but the remaining two-thirds will doubtless contain much more American equipment. At present it is necessary to import steel ores, as those mined in Japan contain too much sulphur. Some good foundry ores are, however, being developed now in the vicinity of Karuizawa."

The Mitsubishi Dock Yard & Engine Company of Nagasaki are installing pneumatic tools as well as machine tools, as are also the Yokohama Dock Company of Yokohama. The Kiushiu Railway Company of Moji are now installing a considerable amount of machinery. Their new shops contain about 40 American machine tools. The company have just placed a large order for Chicago pneumatic tools amounting to about \$6000. The Kawasaki Dock Company of Kobe are an important and enterprising concern, as are also the Ishikawajima Dock Company of Tokio and Uraga. They have recently installed pneumatic tools and air compressors.

In machine tools the Japanese are now building some pretty fair copies of American tools. A concern who regularly build gas engines are now building imitations of Gould & Eberhardt shapers, Smith & Mills shapers and Barnes upright drill presses. They are also imitating Atlas engines and Ideal high speed engines. They are not building a first-class lathe yet. The lathes they do build are of the gap variety.

The Ikegal Works at Tokio are very progressive and have for many years been building planers with a screw feed.

The Germans are very active in developing copper properties. Siemens & Halske have just installed a very fine electric equipment in the Furnkawa mines, near Chuseiji or Nikko. Several new manganese mines are being opened in this vicinity also and are being equipped with modern appliances. The coal mines are being equipped with American coal handling apparatus and an American builder of this class of machinery will next spring go to Moji to superintend the erection of a plant for the Kiushiu Railway Company.

There will be considerable activity in the near future in the development of the textile machinery industry. This work will, however, require foreign capital. The Japanese recognize that they must look to labor saving machinery, as wages are constantly being advanced.

In brass goods, such as small valves and steam specialties, they control their own market. Heavier sizes, however, they are still importing.

Osaka is the center of the electrical industry. The Western Electric Company have a branch shop at Tokio called the Nippon Electric Company, and they supply the country with telephones.

For making brass and wood screws there are a number of plants in Japan. They are equipped with semi-automatic machinery. The Yamamoto Screw Works of Tokio have been established for 20 years.

For fitting out the imperial palace, which is to cost \$3,500,000, a large amount of builders' hardware, &c., will be required. There will also be power equipment, &c., some of which has already been purchased. Takata & Co. of 10 Wall street, New York, will make these purchases.

Despite reports to the contrary, no locomotives are built in Japan. The parts for one were received from England and assembled at Osaka, but it is still to be ascertained whether this was a successful one or not, as the engine after being completed was sunk in a shipwreck between Osaka and Formosa. It was to be used on the Formosa Government Railway.

As to leather belting, only the best qualities can be disposed of. Wire rope is made in Tokio and at the Yasuda Nail Factory at Tokio 1000 kegs of wire nails

are turned out daily. There is a good chance for business in foundry equipments. Molding machines have not been introduced as yet. Malleable iron fittings are coming in use in preference to the English wrought fittings. The forge shop is also still undeveloped. Steam hammers are used almost exclusively. There are but two power hammers in Japan and they are not of American make.

The various Government arsenals will doubtless buy extensively. At present the budgets are curtailed, owing to the general financial depression, but great plans are being made for the future. The Hokkaido Coal Mine & Railway Company have recently installed a large equipment of Ingersoll-Sargent rock drills, compressors, &c.

In hardware lines Coes' wrench is one of the most popular American appliances. English anvils are used extensively, as the American types are too high priced. America holds the trade in shovels, as those made in Japan are of poor make. Wheelbarrows are not used. All vehicles must be of narrow gauge.

The Japanese business man I have found to be as good to trade with as the American. If he can make money by paying cash he does not hesitate to do it. The Germans, who are the most active workers among the foreign business element, are inclined to give long credits. The Germans, by the way, are not only the strongest rivals, but also the most satisfactory competitors.

PERSONAL.

W. L. Sims has resigned his position as general manager and treasurer of the Empire Iron & Steel Company and will remove to Birmingham, Ala., having accepted the general Southern agency for the Maxim boiler and water tube boiler, manufactured by the Maxim Company of Starrucca. Mr. Sims' headquarters for the South will be at Birmingham, Ala., and sub-agents will be appointed to thoroughly cover the Southern territory.

E. L. McGary, until recently chief engineer of the American Steel Hoop Company, has established himself in the Kleber Building, 223 Fifth avenue, Pittsburgh, as a rolling mill engineer and designer of a wide range of finishing plant.

J. F. Townsend has been appointed traffic manager of the Shelby Steel Tube Company, with office in the Conestoga Building, Pittsburgh, Pa. He will be in charge of all relations with railroads, steamship and other transportation companies, and will settle questions relating to the movement of inbound as well as outbound traffic, freight rates, routing, tracing shipments, freight claims for loss, damage or overcharge occurring while material is in transit.

N. S. Keith, who was among the first to devote serious attention to electro-metallurgical work, has established himself as consulting, mining and metallurgical engineer at 95 Liberty street, New York.

At Pittsburgh, F. M. Osborne, president, and C. W. Baine, secretary, of the Pittsburgh Coal Company, have resigned their positions. It is said the reason for Mr. Osborne's resignation is that he desires to give more attention to his private matters and also because his residence is in Cleveland and his position as president of the Pittsburgh Coal Company necessitated that he spend nearly the entire week in Pittsburgh, away from his family. It is probable Francis L. Robbins will be elected president to succeed Mr. Osborne.

O. B. Warren has been appointed superintendent of mines of the Donora Mining Company, a constituent interest of the Union Steel Company of Pittsburgh.

The mechanical engineering department of the Republic Iron & Steel Company was opened last week at Youngstown, Ohio, with Willis McKee in charge. Heretofore S. V. Huber & Co., Ferguson Building, Pittsburgh, have had charge of the engineering of the Republic Iron & Steel Company and will be retained as consulting engineers.

Chas. W. Goodnough, who has been the sales manager of the Pittsburgh Stove & Range Company since

their organization, tendered his resignation some weeks ago, to take effect on the 16th inst. Mr. Goodnough resigned his position to become the Pittsburgh manager for the Prizer-Painter Stove & Heater Company of Reading, Pa., who will open a branch office and warehouse in Pittsburgh for the purpose of supplying the trade in Western Pennsylvania, Ohio, West Virginia and Western Maryland. Prior to the consolidation of the stove interests in Pittsburgh Mr. Goodnough was a member of the old established firm of De Haven & Co., and largely assisted in promoting the Cinderella stoves and ranges.

Arthur Hughes has been appointed statistician for the Youngstown Iron, Sheet & Tube Company, at Youngstown, Ohio.

By a report on the estate of the late Henry M. Curry of Carnegie Steel Company of Pittsburgh there remains a balance of \$6,115,117.54 for distribution among his heirs.

Charles M. Schwab, president of the United States Steel Corporation, will not be present at the annual banquet of the Business Men's Association of Homestead, Pa., to be held early in January. Mr. Schwab sails for the Continent on December 26.

Frank C. Roberts, the well-known designer and builder of blast furnaces, has just returned from a professional visit to England. His firm have undertaken the following blast furnace construction: Guest, Keen & Co., Limited, Arthur Keen, chairman, will reconstruct their Cardiff plants; Bolekow, Vaughan & Co., Limited, David Evans, general manager, will construct two new plants, and the Consett Iron Company, Limited, George Ainsworth, general works manager, will build four new plants.

David Lamond & Son.—After January 1, 1902, the business of David Lamond, engineer and contractor, Ferguson Building, Pittsburgh, will be carried on under the name of D. Lamond & Son, the members of the firm being David Lamond and David D. Lamond. David Lamond has under contract at the present time three rail mill furnaces, 36 feet 6 inches by 12 feet, to be erected at Tremly Point, N. J., for the American McKenna Process Company. In connection with these furnaces the same firm have a contract for six boilers of the Hyde type. This is the third plant of furnaces David Lamond has had for this company, one being at Joliet, Ill., and one at Kansas City. Among other contracts are one for two C. H. Foote fire brick stoves, 16 x 65 feet, at Sligo, Mo., for the American Steel Foundry Company, St. Louis, Mo.; one Foote stove, 19 x 75 feet, at Scottsdale, Pa., for Corrigan, McKinney & Co. of Cleveland; one Foote stove, 20 x 82 feet, for the Marting Iron & Steel Company's furnace plant, Ironton, Ohio; one Foote stove, 20 x 75 feet, for the Dayton Coal & Iron Company, Limited, at Dayton, Tenn. All of these are now under way.

The Youngstown Steel Casting Company.—The Youngstown Steel Casting Company, at a meeting held in Youngstown, Ohio, last week, decided to increase the capital stock of their concern from \$50,000 to \$100,000. This concern were formerly known as the Walker Engineering Company, and will erect a plant in Youngstown for the manufacture of steel castings. The company will have two buildings, one a brick structure and the other of steel frame. Contracts have been placed for a 10-ton and a 20-ton electric traveling cranes, three gas producers and electric light plant, forge shop and machine shop. E. B. Lawrence is president, Thomas Van Alstine, vice-president, and J. W. Rodgers, secretary and treasurer.

The American Shipbuilding Company have closed contracts for two more large steel steamers, making 36 vessels of heavy type for lake traffic that the company now have under construction. The new vessels are ordered by Captain John Mitchell and others of Cleveland, and will cost \$300,000 each. They will be 416 feet keel, 50 feet beam and 28 feet deep.

SUGGESTIONS FOR INVENTORY.

THE following suggestions, which apply to taking account of stock, illustrate the methods adopted by an enterprising Hardware house. The suggestions, in typewritten form, were distributed to the employees for their guidance in taking last year's inventory:

1. Sheets which we will use are the ordinary blanks which Mr. _____ uses for writing up orders. It is entirely proper to write on both sides, and better, from the fact that the bulk of books when bound finally will be smaller. Please be careful that the two holes on the left hand side of the pages are not torn, as the sheets will be bound using these holes.

2. We want you to think as you read and see where these suggestions in regard to inventory are good, and as you work, in either stock or writing down, have matters clear whether they are touched upon in these suggestions or not.

3. Do not write upon the two top lines of any sheet.

4. Do not write upon the two bottom lines of any sheet.

5. At the head of each sheet indicate the part of the store covered by it.

6. Be sure that the space of one line is left between items of different kinds. This applies to different items of the same kind of goods. For instance, there should be a line left between Flat Head Bright Screws and Flat Head Brass Screws or other goods. Also, for instance, No. 7 Hand Saws and D 8 Hand Saws would take a different discount and a line should be left between them.

7. We wish you to be careful that all goods of a certain kind are written under each other. For instance, if No. 11 Chest Handles were in one row of shelves and No. 12 in another the goods should be rearranged so that all Chest Handles will be together, and the inventory of Chest Handles will all be in immediate sequence. This is very important for the proper arrangement of inventory and we will ask you to be careful about it.

8. The only exception to the above is in Builders' Hardware. Mr. _____ has an especial arrangement for this line of goods and inventory should be taken with this arrangement in mind. This, however, Mr. _____ will attend to.

9. Each evening we wish those working on inventory to stop at 5 o'clock and have all of the sheets which they have taken during the day priced, extended and added. The addition which you make must come immediately under the columns in which you make the extension. We do not wish you to use the last three columns which are on the sheets for figures.

10. We will furnish each of you a separate want book, which you will find divided as follows:

a. *Wants*.—Under this head make a notation of all short items for which orders should be placed. At the end of each evening transfer from this want book such items only as should be ordered immediately, in such case marking out or checking off the item added on the general want book.

b. *Goods Which Should Have Sample Boards Made for Them or Some Better Display Devised*.—Under this division simply make a memorandum of goods and after inventory is completed, at our convenience, we will properly provide some display.

c. *Goods Which Are Bad Stock, or Odds and Ends*.—As in above case, simply make a notation of this, and we can afterward go over them.

d. *Goods Which Should be Marked, or Additional Lists Made, or Prices Corrected*.—Under this head you will simply make a notation of where you think prices should be corrected, or a notation where goods are not marked and should be marked, or where other lists besides the one in the price book at the front of the store should be put near the stock. For instance, the writer is working now on a list of Hames, which we have not had and which should have been made. This is the kind of thing that you want to note under this column.

The suggestions that are gotten up in this book we do not wish brought up until after the inventory is complete, unless there is some very important matter which should claim our immediate attention. It is simply an arrangement for afterward getting our stock and facilities for prompt and accurate sales in better condition.

11. We wish you to leave all stock in absolutely clean condition, taking out the goods from where they are stored and sprinkling and sweeping underneath. Let us have a nice clean store, as far as the corners and out of the way places are concerned, after our inventory is completed.

12. All shelves and bins should have all of the goods taken out and be brushed out. It is a very good plan to have with you a box of damp sawdust for sprinkling in shelf. Then dust the same out or wipe it with a damp cloth. This will diminish materially the dust floating around the store and will add a good deal to your comfort in cleaning.

13. Where two or more boxes have been opened one of the boxes should be filled. For instance, if one of the boxes of No. 1036 Padlocks has seven in it and another one eight, make one of the boxes a full dozen, leaving one box with the remaining three locks in it. Do not carry this matter too far and throw away boxes which might be used. It is not a bad plan to have an empty box, with the proper number on it, convenient for use where orders call for less than a package.

14. We wish you would be careful in going over the stock to see where you think it advisable to oil certain goods. For instance, see that Cross Cut Saws, Circular Saws and other things which you know will be liable to suffer from rust receive a slight coating of oil.

15. There will be a different man each day whom we do not expect to take any part in the inventory work unless it be the matter of some verbal information to some one. We will arrange this as follows:

a. From Wednesday, December 26 to Saturday, January 5, Mr. _____.

b. From Monday, January 7, to Saturday, January 12, Mr. _____.

c. From Monday, January 14, to Saturday, January 19, Mr. _____.

d. From Monday, January 21, to Saturday, January 26, Mr. _____.

16. On the morning of December 31 we wish the following stocks taken, regardless of your attention to other matters of inventory—that is, we want you to arrange among yourselves to take these items, leaving off your work in other items:

a. Nails, both kegs down stairs and broken lots in bins.

b. Horseshoes, both full kegs down stairs and broken lots in bins up stairs.

c. Bar Iron.

d. Loaded Shells, Cartridges, both full cases and broken lines in shelves.

e. Shot, both in case in front and bags in rear.

f. Powder, both in canteens in front and Powder in magazine at side of store.

Mr. _____ will on this date take the stock of Machine Needles, and in doing so will please estimate the ones in bins.

17. The following is as important as anything, and we wish each of you to get it into your records very distinctly.

a. Up to night of December 31 enter all goods which you sell which have been taken.

b. On the morning of January 1 and after enter all goods which you sell which have not been taken.

After the stock of any items is taken write a tag so stating and attach to the goods.

We wish each man writing up sheets to keep a consecutive number on all sheets written. For instance, Mr. A. would head his sheets "A" 1, 2, 3, 4, &c.; Mr. B. would head his sheets "B" 1, 2, 3, 4, &c.

At the end of the book of record of sales we will indicate quite a number of pages "List of goods which have been taken." Under this head, at the end of each night indicate the goods which have been taken. For instance, if Mr. _____ had the day before or the night before taken an inventory for Hames, simply write Hames down in this list. When it is necessary to make exception to such list they should properly note and then afterward erase. For instance, if Mr. _____ has taken all of the Hames except those in some particular location or some particular kind, he would indicate Hames except _____. When this inventory was complete he would simply erase the exception which he had made.

HARDWARE.

HINDRANCES IN THE RETAIL HARDWARE BUSINESS.

Business in Hardware as in every other line is necessarily attended by difficulties and hindrances. These are accepted as a matter of course by the intelligent merchant, who, recognizing them, faces in a practical and sensible way the problem as to how they are to be met and overcome. His endeavor is, in spite of them, to make a success of his business. Some of the special hindrances in the Hardware trade are enumerated by our correspondents whose letters are given in another column. They reflect the situation as it is found by practical men, most of whom succeed in doing a profitable business notwithstanding the difficulties with which they are contending. A careful analysis of what is said, in connection with an effort on the part of each merchant to discover and define the obstacles by which he is beset, will prepare the way for wise and energetic measures to adapt the business policy to the changing circumstances of trade. That this may be done advantageously is illustrated by the success which many have made, while the failure of others enforces the folly of those who shut their eyes to existing conditions.

Many of the hindrances in the Hardware trade are connected with the innovations which are being introduced in the old ways of doing business, as illustrated in the catalogue houses and department stores. Others are the result of competition within the trade, as merchants in many places are forced to compete with jobbing houses and manufacturers as well as their own legitimate rivals. The attractions offered by the larger towns and cities have, too, an important influence in drawing customers from the rural districts and smaller villages. In special lines the fact that high prices are prevailing, owing to the operation of combinations or other causes, is recognized as having a repressing effect on sales and profits, although this influence is not especially marked in prosperous times like the present. The increasing expense of doing business as it becomes more complex and takes a higher plane, thus keeping pace with the commercial progress of the times, is a factor which must be constantly reckoned with. The wise merchant must take these and other similar matters into account as the conditions under which it is necessary for him to carry on his business. In many instances these difficulties are so positive and obstinate that the task of mastering them presents a serious problem.

There is, however, another class of difficulties which are to a good extent within the merchant's control, and which it behooves him to eliminate from his bundle of troubles. Surely the external and unavoidable hindrances should be sufficient to satisfy any reasonable man, without the addition of others which are unnecessary, and at the same time are frequently the most serious obstacles to the success of the business. Most of these come under the head of bad business management, and result from the inattention or personal limitations of the merchant. Among the hindrances of this character suggested by our correspondents are the following: Letting things get into a rut; suspicion of other dealers; incompetent clerks; little knowledge of the business; paying too high prices for goods; leaks at the money drawer; investment of needed capital in outside enterprises; overbuying; unnecessary cutting of prices; carrying incomplete stocks; lack of attention to business; giving too much credit; losses through bad accounts; lack

of business system; refusing to recognize changed business conditions.

It is easy for the merchant to discover and denounce the things in his circumstances or in the trade at large which militate against success, but it is far more difficult and far more profitable for him to find out the things in his own establishment which are hindrances to his success, which, if corrected, would give a new tone to his business, increasing both the pleasure of transacting it and the profit derived from it.

Condition of Trade.

Business continues to give more definite indications of the near approach of the holidays and of the end of the year. Many travelers are already at home, and on this account, as well as because it is a time when, in anticipation of the annual inventory, purchases are restricted as much as possible, less effort is being made by manufacturers to secure orders. The volume of business thus shows a falling off. Notwithstanding these influences, which tend to restrain the movement of trade, there is a good deal doing. The most obvious and urgent business is in sorting up orders to meet immediate requirements. Of such demands there are many, as retailers' stocks generally have been quickly depleted as a result of the good business conditions which have so generally prevailed. It is found that even with a liberal buying vacant places on the shelves and in the warehouses are apt to develop. The prosperity which exists has prepared the way for an exceptionally good holiday trade, and large stocks of suitable goods have been laid in. The cold weather, which has visited many parts of the country, stimulates the calls for winter goods. Some of these are in somewhat inadequate supply. These influences are causing merchants to make urgent orders upon jobbers and manufacturers, and in spite of the season trade is thus unusually active. In the promising condition of trade and the hopeful feeling that prevails liberal purchases are also being made by jobbers and the larger retailers for next year's requirements. The manufacturers are generally taking a much stronger and more independent position with their customers than has been usual until the last year or two. Guarantees are given less recklessly and prices are adhered to more firmly. There is, too, a determination to refuse to accept blanket orders or to make contracts all the advantages of which are on the side of the buyer. The difficulty of obtaining raw material is still felt in many lines, and this, with the strength of the Iron market, gives a firm tone to prices generally. The few lines which are under suspicion have apparently little influence on the market as a whole. The break in Copper has not yet had much influence on the market in manufactured goods, owing to the fact that it was in a good measure anticipated. Collections are in general satisfactory and the whole trade is evidently in excellent condition.

Chicago.

(By Telegraph.)

Zero weather put in its first appearance the past week, and caused a sudden rush for certain classes of goods. Skates naturally were in high favor. Other goods which had been lagging felt the effect of favorable seasonable weather. Jobbers report a rush of inquiries relative to Wire Nails, Barb Wire and other staple goods. Stocks in dealers' hands are not only low at present, but have been for some time, and as it seems desirable to make preparations for spring trade, the retail merchants are beginning to wonder whether

it is not about time to arrange for such stocks. Indications point to a heavy trade as soon as a firm basis in prices is found to exist. A feature of business at present is the very heavy movement of all classes of goods to dealers west of the Missouri River. The railroads extending through that territory are in the habit of reducing their freight rates in December, to enable merchants to lay in large stocks of goods for the spring trade. These freight rates will be restored at the close of the month. The limited time, therefore, causes great activity among all who participate in this trade. The general volume of business is diminishing, but still continues far in excess of the usual conditions prevailing in December. The Heavy Hardware trade is enjoying a very good demand, with much difficulty still being experienced in securing certain classes of goods.

St. Louis.

(By Telegraph.)

The Hardware market is perhaps a trifle less active than when we made our last report, but still a very large volume of business is being cared for. The jobbing trade are especially active and busy at this time laying new plans and preparing their salesmen for the campaign of the new year. A feeling of marked confidence in the future of the market is apparent, and is backed by the placing of heavy orders for stocks. Complaints are still heard on account of the slow filling of requirements by some of the Eastern manufacturers. This condition is plainly noticeable in lines of Builders' Hardware and some classes of Carpenters' Tools. Spring goods are moving nicely, and the bookings of the trade are in very heavy volume. Several instances of orders for opening stocks are noted. Collections are said to be satisfactory. A fair volume of trade is reported in the heavy department of the market.

Boston.

BIGELOW & DOWSE COMPANY.—We have had all kinds of weather the past week, with a temperature ranging from 65 to 15 degrees. A heavy rain for 18 hours has melted the snow and the high water has cleared the rivers of ice and would have caused great damage from freshets had not frigid weather followed so quickly.

The skating should now be good for Christmas, which will insure the best sale of Skates for many years.

The Sleds are all sold and Jobbers' stocks are exhausted, with no possibility of replenishing them.

Spring orders for Wire Cloth and Screen goods are being placed quite freely.

The destruction of the largest manufactory of Screens and Doors, with a heavy stock of Wire, will naturally make a shortage of these goods when the season opens.

Last year's experience of those who placed late orders for Wire Fencing is being guarded against this year by customers placing early orders.

The Steel and Iron market is very firm and the stocks of merchandise in dealers' hands are light. The conditions indicate continued firm prices for the first half of the coming year.

Louisville.

W. B. BELKNAP & Co.—The excitement of the week has been the rise in cotton, which will do much to relieve the Southern country of this valuable commodity, which has been held against the extreme low price prevailing for the last month or two. It will be a relief to that market and to the whole Southern money market as well. Along with this has come the advance in cereals, which has taken the place of mining stocks as a center of interest in the speculative world.

Meanwhile the railroads continue to show increased earnings and are hampered in their business only by the scarcity of cars. This very scarcity of cars has prevented some of the cotton in the South from moving, and as drafts are issued against bills of lading, there has been a delay on this score, so the factors and shippers write. It has also interfered with the movement of coal in this State and Tennessee, and Iron in the great iron centers of Alabama. So the orders for car construction are still coming in freely, so the mills say, and we are prone to believe it to be the fact.

The minor purchasing of heavy goods has abated, as

is usual at this season, when people are beginning to give themselves over to holiday goods and Christmas gifts, to such an extent that the retail Hardware stores are pretty much turned over to that sort of business. In fact the modern Hardware store is no longer the dry and uninteresting collection of ordinary tools and 10-Penny Nails that it used to be. It is brightened and livened up with polished Cutlery and glistening Plated Ware, with toys and toilet articles, with Guns and hunting and traveling equipment specialties, and much to allure even the ladies and children as well as the masculine buyer. The retailer to-day realizes that he has to compete with an enterprising class of merchants, who have set up variety stores, and it is a pleasure to note that where he once enters the list he is no mean competitor for any outsider.

Modern Hardware lends itself to attractive show windows, and those in our city are fully reflecting the Christmas demands.

Baltimore.

CARLIN & FULTON.—By the time these lines will have reached your readers the business of the year will have nearly ended, and many will be busily engaged in the work of stock taking and getting ready for the annual balance sheet to determine accurately whether the net results are as hoped for and commensurate with the capital, energy and talent employed in producing them.

This would perhaps be an opportune time for a retrospect of the year, and pages might be written about trusts, combinations and pools, but we will not trespass upon the patience of your subscribers. We will merely say with regard to the trusts that they come and they go. They have existed in every age and in every civilized country. Some have longer lives than others, but none have the gift of immortality. Economy in production by concentration of energy may be the staff upon which the overcapitalized trust leans for its dividends, but regardless of whether Wall Street suffers or not, the spirit of the age is toward development and expansion, and the same enterprise and capital which have given birth to one trust soon bring forth its companion and its competitor.

Whenever incorporated capital in any form of business activity imposes upon the people hardships and wrongs they will never be remedied by any one political party, but must appeal to the best elements of all alike irrespective of party.

In regard to the present conditions of business we believe the consensus of opinion is that the year has been generally a good one for trade, though certain sections have suffered through the failure or shortage of certain agricultural products. Labor has been generally well employed; transportation companies have had all and more than they could do; the manufacturers have had nothing of which to complain; the bank clearings throughout the country indicate an immense business, and as far as we can all see the prospects for the coming year are excellent.

Very soon now, forgetting the contentions and rivalries of trade, we will be wishing each other a happy Christmas, and for at least one day there will be peace on earth in nearly every home, and the feeling of good will to men will make us glad with the little ones on the anniversary which appeals to the best in every individual, young and old, rich and poor, throughout the civilized world.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY.—The general business situation remains fully as favorable as it was two weeks since, and it would be difficult to explain how the present trade outlook could be improved. All kinds of seasonable merchandise are going into consumption rapidly, and the general volume of business is well up to expectations. Orders from the country cover well assorted lines of goods, showing that retail dealers are enjoying a steady and continuous demand. There appears to be plenty of money in general circulation, and as business enterprises of all kinds have proven fairly remunerative a steady demand for goods will no doubt continue to be in order. Farmers are receiving substantial values for their productions, and this im-

portant factor has a potent influence bearing on the amount of business expected. Business men are unanimous in the opinion that present prosperous conditions will insure a large business during the winter months.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The holiday season is at hand, and most of the salesmen are off the road preparing for the Christmas festivities. Not much business is being done by the jobbers at this time.

The year 1901 now fast closing has been a most prosperous one for our great and wonderful country. The Hardware trade generally has shared in this prosperity to a marked degree; especially in the South has this been so.

Last spring in the months of January, February and March, the amount of business done was very large, and the Hardware jobbers throughout this section of the country had to employ an extra force, and even work at night to keep up. After the rush of the spring business was over the filling in orders were numerous, and extended over a wider range of goods than usual.

During the summer and fall the jobbers were equally as busy as they had been in the spring. Many new stocks were bought during the year, and the retail dealers placed heavy orders.

This winter the pace has been continued, and the volume of business has been probably larger than for the corresponding season of last year with most of the houses.

We think that the Hardware jobbers can look back to the year 1901 and feel that it will go down into history as a year in which much good has been accomplished. The progressive houses have adopted many new methods of transacting business. Modern and better facilities have been introduced into every department. New goods have been added to the Hardware dealers' stock, that a few years ago would have been considered very strange seen on the shelves of a Hardware store. In fact, a broader, more liberal and at the same time conservative policy has been pursued by the jobbing houses of the country this year than ever before. Failures in the South have been few and far between, and the financial condition of Hardware dealers in the South was never better than at this time.

Now as to 1902 prospects look bright. While the cotton crop is not so large, and the price is somewhat lower, at the same time it will bring an immense amount of money to the Southern people. In some sections the corn crop has been a failure, but there is such a diversity of crops in the South, this will be overcome. The farmers of the South can raise most anything that can be produced in any other country, and are doing so more and more each year.

The mining interests were never in more satisfactory condition; coal mines, iron mines and phosphate mines are being worked to the fullest capacity, and are producing their products in immense quantities. The manufacturing interests of the South are larger and in better shape than ever known; more new manufacturing plants were established in the South during the year 1901 than ever before known in the history of the country for one year, and most all of them are remarkably successful.

We feel that the Hardware trade of this section will enjoy their Christmas with a satisfied contentment with the past, and will look forward with pleasant anticipation for the future.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—The first half of December has afforded an active trade, and the demand for goods has probably been larger than in any previous December.

The weather, however, which has been mild and favorable for outdoor operations, has now become intensely cold, and less Hardware will be wanted in most lines. The fall trade has hung on beyond expectations, and now, as we come close down to the holidays, trade will drop off, and will be only of a pick up character.

The attention of wholesale houses will soon be turned mainly toward cleaning up the corners and straightening out stocks and getting ready for inventorying.

Prices are generally firm, a few articles, such as Nails, being the notable exception. Firm prices are likely to prevail generally during the spring, and dealers will doubtless act on this assumption for the early trade—a condition that will be welcome on all hands. It is not often that conditions for a healthy trade ahead promise more favorably than they now do in the closing weeks of the first year in the new century.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—The near approach of the holiday season has stimulated the call for certain kinds of goods for the Christmas holidays, and many customers have anticipated their wants for certain goods which with the mildness of the season have not been needed, and are not likely to be needed for the balance of the year 1901; certainly not unless the sudden change to cold weather continues, which will enable persons who have bought Skates, Sleds, Snow Shovels, &c., to get rid of them. Jobbing houses are now preparing for their yearly inventory, which is likely to begin in most cases during the coming week. The compliments of the season to yourselves and to your patrons.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—Price of wheat advancing to a point where many farmers had set selling limit, millions of bushels have lately changed hands. Clearings first three days of this week a record, partly in consequence of wheat sales as well as other farm products. Holiday trade is reported good in all lines.

We are having our first frosty weather, roses having been in bloom up to this time. Building permits are being taken out here in the city as though it was spring or summer. The wholesale trade is holding up so as to make it a difficult matter to take inventories. Collections are better than heretofore reported.

New Orleans.

A. BALDWIN & Co.—Contrary to our expectations business has been of a much livelier nature than we look for at this season of the year. A great many customers are anticipating their wants for spring goods, and the output is exceptionally large at this time. Usually round the holiday season there is considerable falling off, but this year is an exception to the rule.

While making their spring purchases they are also buying considerable quantities of Hardware in all lines. Altogether, the situation is very satisfactory.

NOTES ON PRICES.

Wire Nails.—There is no noticeable change in the condition of the Wire Nail market. Prices have reached a level below which there appears to be little desire on the part of makers to go. Quotations which do not cover a full assortment of sizes of Nails are not recognized by the large manufacturers as serious competition. The strength of Billets, which are high in price and hard to obtain, naturally has somewhat of a restraining influence upon the Nail market. Irregularity in quotations continues, and prices made depend largely upon the location from which Nails are ordered. A common quotation for ordinary lots is \$2.10, f.o.b. mill, but this price is shaded freely on attractive business. The leading interest are pursuing a conservative policy and permitting some orders at low prices to go to their competitors, while at the same time they are taking excellent care of their regular customers.

New York.—Demand for Wire Nails in the local market has fallen off somewhat during the week. Shipments from some mills have been delayed as the result of the recent severe rains. Most of the jobbers at this point have comparatively light stocks, and will be inconvenienced if the delay in receiving Nails is prolonged. The market is represented in a general way by the following prices: Small lots from store, \$2.35 to \$2.40; car-loads on dock, \$2.25.

Chicago, by Telegraph.—The leading manufacturers report a heavy business, which is partly due to large purchases by merchants west of the Missouri River, who are taking advantage of the usual reduction in freight rates

In December. The Western jobbers are purchasing very large quantities of both Wire Nails and Wire Fencing. This movement is sufficiently large to prevent any accumulation of stock in manufacturers' hands at present. The outlook for the future is quite promising, and it is expected that prices will shortly be found on a solid basis which will warrant jobbers and dealers in stocking up. It is believed that the entire trade has seldom had such light stocks as at present. Jobbers are obliged to purchase larger quantities than they feel like doing under the circumstances, with manufacturers' prices exhibiting a downward tendency, but they find that dealers are taking their Nails as rapidly as they are received from the mills. Small lots from stock are quoted at \$2.25 to \$2.30, and carloads at \$2.20.

St. Louis, by Telegraph.—Conditions are very much the same in the market for Wire Nails, prices being irregular. The demand and inquiry are said to be in very good volume. We quote \$2.30 as being about the most general price at this time.

Pittsburgh.—A fair amount of business in Wire Nails is being placed, but it is confined mostly to small lots, buyers continuing to place orders only for actual wants. Now that the weather is broken up building operations will be seriously retarded, and a further decline in demand for Wire Nails is probable. Low prices continue to be made, and we quote Wire Nails at \$2 to \$2.05, f.o.b. cars Pittsburgh, in carload lots. Small lots are held at \$2.10 to \$2.25 at mill, depending on the order.

Cut Nails.—There is no increase in the demand for Cut Nails. It is a question of considerable interest to the trade whether the manufacturers will deem it to their interest to make a reduction in the price of Nails at their regular monthly meeting, which is scheduled for the near future. The market is firm at the following quotations, f.o.b. Pittsburgh, plus the actual freight to point of destination, terms 60 days, or 2 per cent. off in 10 days:

Carload lots.....	\$2.05
Less than carload lots.....	2.10

New York.—Cut Nails continue to be ordered at this point in about the usual proportions. Merchants whose trade demand Cut Nails usually order them irrespective of price. Representatives of mills are adhering to the price of \$2.25 for Nails from store. Jobbers are asking the same price generally, but in some instances are selling 2 cents below these figures. New York quotations for carload and less than carload lots are as follows:

Carload lots on dock.....	\$2.18
Less than carload lots on dock.....	2.23
From store.....	2.25

Chicago, by Telegraph.—Jobbers quote small lots from stock at \$2.35 and report that the demand is being curtailed by the low price of Wire Nails.

St. Louis, by Telegraph.—A fair business is being done in the market for Cut Nails and small lots from store are quoted from \$2.30 to \$2.35.

Pittsburgh.—The low prices ruling for Wire Nails have interfered very seriously in demand for Cut Nails, which is lighter than for some time past. Prices are being pretty firmly held and are shaded only by jobbers. We quote for domestic trade, f.o.b. Pittsburgh, plus Tube freight to point of destination, terms 60 days or 2 per cent. off in 10 days:

Carload lots.....	\$2.05
Less than carload lots.....	2.10

Barb Wire.—As usual at this season, only a limited amount of business is being done. Regular quotations are to some extent nominal, as concessions of from 5 to 10 cents are made in some cases. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots, Painted.....	\$2.60
To jobbers in carload lots, Galvanized.....	2.90
To jobbers in less than carload lots, Painted.....	2.65
To jobbers in less than carload lots, Galvanized.....	2.95
To retailers in carload lots, Painted.....	2.70
To retailers in carload lots, Galvanized.....	3.00
To retailers in less than carload lots, Painted.....	2.80
To retailers in less than carload lots, Galvanized.....	3.10

Chicago, by Telegraph.—The heavy demand from the West has been referred to under the head of Wire Nails. Good sales are also reported to jobbers in other sections of the country. The outlook for this branch of trade is exceedingly promising. Small lots are quoted at \$2.70 to \$2.80 for Painted and \$3 to \$3.10 for Galvanized, with 5 cents off for carloads.

St. Louis, by Telegraph.—The Barb Wire market continues to move in very good volume, and inquiry and demand are pointed to as being satisfactory. Jobbers quote carload lots at \$2.80 for Painted and \$3.10 for Galvanized.

Pittsburgh.—There is a very limited demand for Barb Wire and manufacturers are going after business very aggressively, with the result that prices are being shaded to a considerable extent. From 10 to 15 cents per 100 pounds less than regular prices is being done for attractive orders. Regular quotations, which, however, are very materially shaded, are as follows: Galvanized Barb Wire, \$2.90 in carload lots to jobbers, and Painted, \$2.60. Terms 60 days net, 2 per cent. discount for cash in 10 days, f.o.b. Pittsburgh.

Plain Wire.—Manufacturers of Wire products are buying Wire in large quantities for next season's trade. There is a good deal of unevenness in prices. Regular quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots.....	\$2.25	\$2.65
To jobbers in less than carload lots.....	2.30	2.70
To retailers in carload lots.....	2.35	2.75
To retailers in less than carload lots.....	2.45	2.85

The above prices are for the base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9.....	Base.....	\$0.40 extra.
10.....	\$0.05 advance over base.....	.40 "
11.....	.10 "	.40 "
12 and 12½.....	.15 "	.40 "
13.....	.25 "	.40 "
14.....	.35 "	.40 "
15.....	.45 "	.75 "
16.....	.55 "	.75 "
17.....	.70 "	1.00 "
18.....	.85 "	1.00 "

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—The situation in Plain Wire is still quite satisfactory to the manufacturers. Orders are heavy and prices are being maintained fairly well. Jobbers quote small lots from stock at \$2.20 to \$2.25, base.

St. Louis, by Telegraph.—A very good trade is being done in Plain Wire and quotations are without change since our last report. Jobbers quote No. 9 from \$2.40 to \$2.45 and Galvanized from \$2.80 to \$2.85, with the usual advance for other sizes.

Pittsburgh.—The mills have caught up with orders and are now making prompt deliveries. There has recently been a very large increase in Wire drawing capacity. Prices continue to be shaded, depending on order. We quote:

To jobbers in carload lots.....	\$2.25
To jobbers in less than carload lots.....	2.30
To retailers in carload lots.....	2.35
To retailers in less than carload lots.....	2.45

Galvanized Wire up to No. 14 is 40 cents advance on Plain; Nos. 15 and 16, 75 cents advance, and Nos. 17 and 18, \$1 advance. Terms are 60 days, with 2 per cent. off for cash in 10 days, f.o.b. Pittsburgh.

Copper and Copper Goods.—The decline in Ingot Copper, as referred to elsewhere, has naturally had more or less influence on goods into which this metal enters as a material, but has had as yet comparatively little effect on current prices. The trade have been watching the course of things and keeping in close touch with the Copper market, so that they have been prepared for the present condition of things. What has happened has thus, in large measure, been provided for, and in Copper products generally there has been little change in the market. The general consensus of opinion is that for the present, and probably for the rest of the year, there

will be no important changes in prices. A meeting of the manufacturers comprising the American Brass Association was held Tuesday, December 16, at which it was determined to make no reduction in goods manufactured by them. As the interests dominating this association practically control those of the American Sheet Copper Association, it is confidently predicted by responsible sources that no change in price in Sheet Copper will be made in the near future. The same process of reasoning applies to the Seamless Brass and Copper Tube Association, who met December 17 and made no changes in price. While radical changes in Raw Copper may alter the present status, it is believed no reductions will be made in manufactured Copper and Brass this year. What may occur in the middle or latter part of January is another matter. One argument of manufacturers of Copper and Brass is that with stocks of material on hand at the old price a sufficient period should elapse to work it off at current rates, especially as the domestic demand warrants it. The present price of Bare Electrolytic Copper Wire at mill is 16½ cents per pound, base. Insulated Weather Proof Wire 15¾ to 16 cents at mill. Sheet Brass, Brass Rods, Brazed Tubing and Brass Wire are still quoted at the old prices, a good reason for which is the relatively low prices at which Brass Goods have been sold for some time.

Shovels and Spades.—The manufacturers, who have been holding a protracted session, have concluded their deliberations and adjourned. So far as the trade at large are concerned the matter of principal interest is the fact that existing prices were reaffirmed, the only change made being a reduction in the special hollow back goods, which were put on the market some months ago. The association is regarded as in excellent condition. The reports of the several manufacturers indicate a very satisfactory state of trade and a large volume of current business.

Cordage.—The Rope market continues in much the same condition as for some time. Demand is restricted to requirements, which are moderate. Quotations vary with different manufacturers, as follows, on a basis of 7-16 inch and larger: Sisal Rope, 8½ to 9¼ cents; Manila Rope, 12¾ to 13 cents, with 1¼ cents rebate per pound in large quantities allowed on both kinds of Rope.

Glass.—As far as can be learned there is little indication that headway is being made toward bringing outside Window Glass manufacturers into a price agreement with the combines. The market is unsettled, especially in the West, as a result of the low price made by factories outside the combine. It is too early to forecast the future of the market. The jobbers' association quotations, on both double and single strength, over the entire country, are as follows:

	Discount.
Less than car lots from store.....	90 %
Carloads from store.....	90 and 7½ %
Carloads, f.o.b. factory.....	90 and 12½ %

It is understood that Glass jobbers outside the association have made quotations on less than car lots of Glass from store of 90 and 5 per cent. discount, also that the association price on carloads, f.o.b. factory, has been shaded.

Paints and Colors.—**Leads.**—A meeting is reported soon to be held by the corrodors' committee, to try and harmonize the different views now existing, and if possible put prices of Lead products upon a more even basis than has recently characterized the market. Demand for White Lead in Oil is only moderate, and quotations are unchanged, as follows: In lots of 500 pounds and over, 6½ cents; in lots of less than 500 pounds, 7 cents per pound. These quotations are frequently shaded ¼ to ½ cent per pound. The Union Lead & Oil Company, who are completing a large plant in Brooklyn which it is said will be started about January 1, have purchased a piece of ground at Thirty-ninth street and Ashland avenue, Chicago, on which they propose to erect a second factory, and will build a third plant in St. Louis. The company will then be in a position to take a very important part in the White Lead trade.

Oils.—**Linseed Oil, Etc.**—Some of the city crushers

have reduced the price of Raw Linseed Oil in lots of five barrels or more to 52 cents, which is a reduction of 3 cents per gallon. In lots of less than five barrels 1 cent more per gallon is charged, and Boiled Oil is 2 cents per gallon advance on Raw. Some crushers are still holding to 55 cents for five barrel lots. State and Western Oil is quoted at 51 to 52 cents per gallon for Raw, according to quantity and makers. The decline is the result of a dull market, and has taken place in the face of an advancing seed market. The demand is confined largely to small lots. Lard, Cotton Seed, Tallow and Whale Oils show an advance in price for the week from 1 to 2 cents per gallon. Sperm Oil is held at an advance of 2 to 4 cents per gallon.

Spirits Turpentine.—There is a fair demand for Turpentine at this point, at ¼ cent less than figures quoted last week. The Southern market is reported strong as a result of good buying for export. Quotations, according to quantity, are as follows: Southerns, 37½ to 38¾ cents; machine made barrels, 38½ to 38¾ cents per gallon.

Correspondence.

ONE-CENT POSTAGE WITHIN CITY LIMITS.

LOUISVILLE, KY., December 14, 1901.

To the Editor: There has been a suggestion made in our papers here that it would be highly proper, as marking the progress of our postal development, that 1 cent per ounce for mail of the first class should prevail within city limits. One of the arguments is that it costs no more to deliver a sealed letter than it does a postal card or an unsealed envelope. This, of course, might apply to outside territory as well, but all progress must be gradual.

For city delivery strictly there is no money paid out to transportation companies, railroads or steamships, and there is a vast deal of matter which might just as well be sent through the mails that is now conveyed by private carrier companies or over the telephone. It is, however, much more satisfactory to have a record in regular letter press form and with the improved prompt mail deliveries in cities, if one might send sealed letters, invitations, bills, receipts for 1 cent the increase in the use of the mails, it is believed, would be largely augmented.

There was a time when drop letters were 1 cent, and it would seem that the time has come to make this concession to the cities, which are really the source of the postal revenue, the only sources that pay profits.

This is not designed to interfere with the development of rural free delivery, but while we are giving country roads and stations the advantage of this latter it is only fair that the interests of the cities also, which, as we say, are the revenue producers, should be cared for as well. It is to be hoped that a movement for 1-cent rate on drop letters will be made and pushed to successful conclusion. What do the readers of *The Iron Age* think about it?

WILLIAM R. BELKNAP.

ILLINOIS RETAIL HARDWARE DEALERS' ASSOCIATION.

The next annual convention of the Illinois Retail Hardware Dealers' Association will be held at Decatur on February 12 and 13.

It has been reported in the trade generally that Clark, Horrocks & Co., Utica, N. Y., who are extensive Fishing Rod manufacturers, were about to enter upon the manufacture of Fishing Reels. This report has been brought in circulation probably by the fact that Clark, Horrocks & Co. are making extensive additions to their Fishing Rod factory, and will continue to make, as in time past, their well-known line of medium priced Fishing Rods. They will not, however, enter the Reel business, but will devote the new building to the manufacture of Rods and their Fishing Tackle Specialties.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE,
NORFOLK ST., STRAND, LONDON, Dec. 7, 1901.

American Tools in England.

ONE of the best experts in Great Britain in Hand Tools is John Osborn, proprietor of the well-known wholesale and retail Tool supply company, Charles Nurse & Co. John Osborn has recently been on a trip to the United States, and has come back full of ideas. Before expressing his opinion upon the prospects of American Tools in this country, I must relate one criticism he made of the Tool trade in America. Possessing as he does three large retail shops, it was natural that he should seek to compare his own store over here with similar institutions in the Eastern States. His conclusion was that the English retailer of artisans' Tools does his work much better than his American *confrère*. He thinks the Tools are much better exhibited, that the shop windows are much more effective in this particular line in England than in America. In short, he gave me the impression that he would like to open a retail establishment on his own account somewhere down in the Bowery. If, therefore, any American retail Tool dealer is coming to England to view the coronation, he would do well to look up the shops of Charles Nurse & Co. in Bishopsgate street, Ludgate Circus and Walworth Road, London.

Keeping Close Watch on English Makers.

That there is no insular prejudice in John Osborn's opinion is evidenced by the fact that 20 years ago nineteen-twentieths of his trade was in English made Tools, whereas to-day more than half of his goods are of American manufacture. Fifteen years ago, when he came into possession of the business, he issued a small 16-page catalogue, whereas his current catalogue extends to 320 large quarto pages. He is of opinion that if the Americans wish to retain their present trade in Tools, they must watch the English makers very closely. He finds that constantly Tools which he has bought from America are being surpassed in value and in price by English makers. In some lines the Americans are still behind. In Spoke Shaves and Wood Rules he finds nothing in America to equal Preston's make over here. Taking price into consideration, he prefers the Chesterman Steel Rules to any other make—American, British or German. For common Steel Squares he can do better with half a dozen English makers, but in point of quality he finds that the Brown & Sharpe and Starrett Combination Squares are superior to anything in this market. Here again, however, price tells its tale, and Birmingham bears off the palm for cheapness. Thus, for a simple Square, the Birmingham is 2 shillings 3 pence, the Chesterman 7 shillings 6 pence and the American 17 shillings. In Saws, Disston's easily hold their own, but a new line which he has recently been purchasing from Jennings bids fair to be exceedingly popular. Another line of goods in which the English make is predominant is that of the Plumb and Spirit Level. During his recent visit to America John Osborn could discover nothing to equal the English make, either in quality or price. Another class of goods in which he does a large trade is that of Brazing and Paint Removing Lamps. In his opinion, the American Brazing Lamp is far too light and "tiny." It inspires no confidence in the user, and in competition stands no chance with either the German, Swedish or French makes. Another point upon which Mr. Osborn insists is that American Tool makers desiring an English trade should advertise much more liberally than they do at present.

American Representatives in England.

As to trade methods, this gentleman has much to say. In the first place, he especially insists upon the importance of Americans sending round thoroughly reputable representatives. Always on the lookout as he is for new goods, he makes it a point to see commercial travelers and agents. He confesses, however, he sometimes loses his patience with what he calls "hop o' my thumb"

travelers, who are here to-day and gone to-morrow. He says further that when he buys from a traveler he expects to be supplied direct. His surprise and indignation are quite natural, when, having given a *bona fide* wholesale order, he has on occasion received an invoice for the goods from one of his keenest competitors. Of course, the difficulty in his case is that he is both wholesale and retail, and as his wholesale trade has grown naturally out of the expansion of his retail, it would seem that among American representatives his status is regarded as being retail, much to the detriment of his wholesale business. He says, not once or twice, but repeatedly, he has written to American houses in America with express instructions that in case such firms could not deal direct with him, under no circumstances must his letters be forwarded to English factors. Yet on this point his express injunctions have been repeatedly ignored, and in consequence letters of his dealing with quantity, quality and other particulars of his trade have fallen into the hands of his competitors. This is particularly annoying to him in connection with his export trade. He does quite a large business in shipping Tools of all kinds, and even Machinery, both to India and South Africa. To transact this business satisfactorily he is bound, in the nature of things, to secure rock bottom prices. Obviously this cannot be done if two or three go-betweens have to deduct their commissions.

I do not think Mr. Osborn would care for me to reproduce in detail a number of other complaints which he made upon American ways of doing business. I was struck with the fact that most of the complaints arose from a perfectly natural ignorance on the part of various American houses as to the methods which obtain in this country. I pointed this out to him, and he admitted that year by year constant improvements were taking place. As during the last four years his trade in American Tools has advanced \$50,000 per annum, and this year that figure has been largely exceeded, it seems clear that Charles Nurse & Co. are a firm worth cultivating.

Wanted.

An English firm who are anxious to cultivate American trade write to me that they would like to be put in communication with a good maker of Spades, Forks and Shovels; also of Wire Netting and various kinds of Wires. For good houses in these lines they state that they can do a substantial business. In a postscript they add that they could do a good colonial business for a manufacturer of Sheet and Bar Iron. They find that the Americans are now competing favorably with Staffordshire and the north country.

More About India.

A review of the trade of India in the year 1900-1901 has just been issued by the India Office. Notwithstanding plague, pestilence and famine, a bad tea crop, serious disturbances and heavy fall in prices of indigo and a host of other most unfortunate circumstances, the imports amounted to over \$300,000,000. Of this sum, Hardware, Cutlery and Agricultural Implements, including Tools and Sewing Machines, amounted to over \$6,000,000, compared with \$5,000,000 during the previous year. A distinct transference of trade in these lines is marked from Great Britain to the Continent of Europe. Thus the imports of Hardware and Cutlery from Austro-Hungary have more than doubled during the past three years, and from Germany there is an increase of 75 per cent., while the English exports of Hardware and Cutlery have fallen from 75 to 70 per cent. of the whole. As I have repeatedly pointed out, the native Indian buyer demands the cheapest and commonest kinds of Hardware, and this the Britisher won't make. The better kinds of Hardware and Cutlery still come from England. England leads easily in Galvanized and Tinned Sheets, but Belgium has the bulk of the iron and steel trade, to the detriment of Great Britain.

The Week's Trade.

No important change needs record in the trading of the week. Business in the Metal rolling, Tube and Wire branches is seriously affected by the instability of the copper market. A report was yesterday going the

round of the Midland market that the Amalgamated Company are coming to the rescue. A partial rally in tin since the collapse of the New York corner has been marked this week, with the result that an improved firmness in the tin working industries has appeared. The New Brotherton Tube Company only pay 3 per cent. dividend, but Nettlefold's and W. & T. Avery are paying their usual interim dividends. Both Cycle and Tube companies are doing badly, and reconstruction is still the talk. On the export side, however, gratifying indents have come from both Australia and New Zealand, the indents being of a general nature and covering assorted articles.

South African dealers are speculating, why I cannot tell, for present reports from South Africa are not as encouraging as the British nation would desire. Trade is slackening with South America, and the European account is in a bad way on both sides of the ledger. Money is hard to come by, and orders grow scarcer and scarcer. As indicating the speculative character of these orders from South Africa, I may mention that the Minister of the Interior for the Empire of Austria has issued a circular to the authorities in Lower Austria, informing them that there is nothing for Austrian emigrants to do at present in South Africa. In consequence of the war, trade and industry are at a standstill, and the presence of large masses of British troops has sent up the price of provisions and other necessities of life. Nor is there any prospect of a change in the immediate future. Even after the close of hostilities, says the ministerial circular, Austro-Hungarian emigrants will have to compete both with the Boers and with the emigrants from England, who will probably be supported by the British Government. This outside point of view is worth more than a ton of official reports which have necessarily to pass the Censor.

The new Australian tariff is having a disastrous effect on the Silver, Plating, Cutlery, and some other branches of Sheffield industries. Several Sheffield exporters sent forward large consignments before the tariff could come into effect, and heavy stocks were accumulated. To make matters worse, some of the heaviest consignments failed to reach Australia in time, and on them duty has had to be paid. Since then the collapse of exports to Australia from the district of Sheffield has been such that practically nothing has been done.

American Bar Iron in Australia.

A few months ago I reported that considerable dissatisfaction had been expressed with American Bar Iron, which had been bought by Australians. The result has been an increasing specification of British Bar Iron. The employment of American Bar Iron would thus invalidate several contracts. The advice now comes from all quarters that strict integrity must be observed in the fulfillment of all contracts, and, if every other care is taken, it is yet possible for the United States to retrieve their position and command the Australian market. As the trade of the Commonwealth is increasing, in a few years time American Bar Iron should again regain its hold. But American makers must see to it that the rolling of all bars is faultless and bad bars must be thrown out before shipping. Bundles of Bar Iron must be made up in 56 and 112 pounds, respectively, and the lengths must be according to specified limits. Strict uniformity in stocks and prices is essential. With the appointment of responsible representatives in Australia there is nothing to prevent Americans regaining this market.

Traveling in Hungary.

With reference to my recent remarks anent my journey in Austria-Hungary, I should like to add that a new law has just come into force regulating commercial travelers. It may be described as paternalism *in excelsis*. Hitherto manufacturers and tradesmen, native and foreign, have enjoyed a general liberty, personally or by their travelers or agents, with regard to the soliciting of custom in Hungary by means of samples or otherwise, execution of particular orders from their clients, &c. By the new law that liberty is seriously curtailed. Henceforth the dealings of all tradesmen, &c., or of

their travelers or agents, beyond the limits of their immediate domicile, whether samples are employed or not, must be confined to such other firms or persons as are engaged in their own particular line of business. The soliciting of orders from private individuals is strictly forbidden. Uncertified foreign travelers and other persons not domiciled at the spot who are suspected in any place in Hungary of non-observance of this law are liable to preventive arrest and detention. Although this law is of such recent introduction, it appears that its provisions are already being enforced with the utmost rigor. All this seems to be stupidly in restraint of trade. On the other hand, it should be remembered that the traveler who can conduct his business within the lines of this new law is practically free from serious competition.

The Prospects in India.

The latest reports from India indicate that the crops in the Punjab and Rajputana are likely to be unsatisfactory. Bombay, however, has had moderate rain in most of its districts. The crops in Madras are fair. On the whole, from what one can gather, the crops will be equal this year to last. Apart from the economic influence which a good crop has upon the standard of life of the natives, it must be remembered that constant engineering work and municipal improvements of one sort and another demand a great variety of metal goods. I adhere to my opinion that with improved shipping accommodations India is likely to prove a magnificent market for America.

Watching American Associations.

I had the pleasure of a visit a week ago from Hans Renold, the well-known patentee and manufacturer of Driving Chains, of Manchester. Hans Renold came in to tell me how closely he watches the development of associations in the United States. He says that a weekly perusal of *The Iron Age* reports on association meetings, together with the general conduct of the American Steel, Iron and Hardware trades, as reported in *The Iron Age*, is to him a constant stimulus. Further, he says that a periodical visit to America has now become a necessity to his being. He returned recently from the States and has since then been writing his impressions in the Manchester *Guardian*. As Hans Renold is known to be one of the most ingenious of inventors and successful business men, I thought it would be interesting to let you know how closely he watches developments on your side. Apropos of association, it is now, I think, common property that the leading Hardware merchants of the English Midlands meet together at stated intervals and are gradually concerting a policy. It is greatly to be hoped that before long the wholesale Hardware trade will assume some shape. It has been chaotic long enough.

AN AUSTRALIAN VISITOR.

J. A. Hockley of Hockley & Co., Maryborough, Queensland, Australia, has been spending a month or so visiting points of interest in the United States. Since leaving Australia about a year ago he has traveled through various manufacturing centers in England and Germany, France and Belgium and is now on his way home via Vancouver and Honolulu. He says as compared with foreign manufacturing and business methods "America tops the lot." Among some of the plants he was shown through were the Enterprise Mfg. Company, Philadelphia; Sargent & Co., New Haven, Conn., and Russell & Erwin Mfg. Company, Stanley Works, P. & F. Corbin and others in New Britain, Conn. He said he almost expected some of the automatic machinery he saw in operation to talk to him, mentioning one factory in which two girls by its aid were turning out the work formerly done by 22 people. Another striking impression made on him was the intelligent appearance of some of the factory employees. He was also attracted by the office facilities and labor saving devices for transacting business expeditiously, as well as the handsome and cheerful appearance of many of the offices. This concern's imports are now pretty evenly divided.

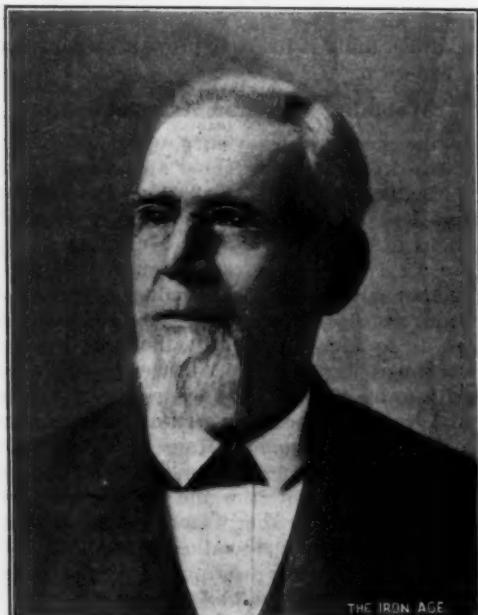
December 19, 1901

between England and America, where formerly the major portion of their requirements came from Great Britain. In the East he has visited, in addition to the cities mentioned, Boston, Providence and Washington, and will see other representative American cities on his way to the Pacific Coast. The principal products of the province of Queensland, which is directly north of New South Wales, are sugar cane, wool and beef and mutton, the latter being shipped largely in frozen condition to England.

DEATH OF JOHN G. BAKER.

JOHN G. BAKER, vice-president of the Enterprise Mfg. Company, Philadelphia, died on Sunday, December 8, after a lingering illness. Death was caused by cancer.

Mr. Baker was born near Princeton, N. J., May 11, 1833. He served an apprenticeship as a carpenter and later went to Washington, D. C., where he started business as a model maker for inventors. His first invention was a machine for making Glaziers' Points, which he later modified into a machine for toothing Hand Saws. He sold this device to Henry Disston of Philadelphia, whose employ he entered in 1861. He invented and carried into successful operation numerous



JOHN G. BAKER.

machines for grinding various kinds of Saws and other labor saving devices while in Mr. Disston's employ. In 1864 he left Henry Disston and started in business with T. Henry Asbury in the manufacture of an Indicator to save the reverse belt on screw cutting lathes, under the firm name of Asbury & Co. Subsequently he invented a Self Measuring Fauet for drawing and measuring molasses and other heavy liquids, which was largely sold throughout the United States.

The firm of Asbury & Co. were dissolved and the Enterprise Mfg. Company were organized in 1866. Mr. Baker contributed some 40 inventions to this last named company, many of which are well known to the Hardware trade. He was also the inventor of the Baker pressure blower, now in use in many foundries and mines throughout the United States. For this invention he was awarded the John Scott Legacy Medal by the Board of City Trusts of Philadelphia, upon the recommendation of the Franklin Institute, in January, 1875. He continued in active interest with the Enterprise Mfg. Company until 1888, at which time he retired from business, although holding the position of vice-president until the time of his death.

He spent his summers at his residence at Edgewood Park, in the Thousand Islands, and his winters at Asheville, N. C. He was always of an exceedingly practical

turn of mind in all his undertakings, and even after his retirement from business he delighted in inventing devices to enable him more perfectly to pursue his pleasures. Among these were Fishing Tackle and photographic apparatus. He was of a genial disposition and left many friends and no enemies. He is survived by a widow and a married daughter.

TRADE WINNING METHODS.

CIRCULARIZING, newspaper advertising, window dressing and the arrangement of goods in the store are trade winning methods which receive particular attention from Kinkerter & Sheppard, 4669 Frankford avenue, Frankford, Philadelphia, Pa.

A Pamphlet.

The firm carry Hardware, Housefurnishings and Mill Supplies. These goods were represented as fully as space would allow in a 40-page pamphlet recently issued. A reproduction of the cover of the pamphlet, reduced in size, is shown in Fig. 1 of the accompanying cuts. The



Fig. 1.—Cover of Pamphlet.

pamphlet was 3 1/2 x 6 inches in size, with buff colored cover, printed in black. The business aim and pleasure of the firm were tersely expressed on the cover, and in a way calculated to impress the recipient of the pamphlet favorably. The reproduction of the first page, shown in Fig. 2, will convey an idea of the good taste displayed

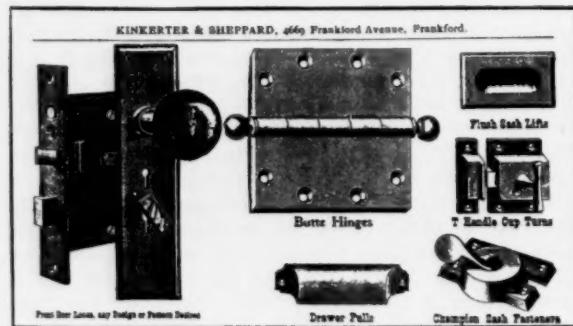


Fig. 2.—Page of Pamphlet.

in illustrating the goods. In some cases prices were given in connection with the illustrations and descriptions of the goods, but this was not done generally.

Distributing the Pamphlets.

Five thousand of the pamphlets were distributed, most of them going through the mail at an expense of 1 cent each. The firm's trade-mark, shown full size in Fig. 3, occupied a position in the upper left hand corner of the envelopes, and was the means of having the pamphlets returned, when the party addressed could not be found. As the firm were careful, however, in the matter of addresses, very few of the pamphlets were returned.

Advertising Mediums.

The firm think that the pamphlets did them considerable good, and more than repaid them for the outlay of brains, printing and postage. They still hold, however, to the newspaper as the best advertising medium

for steady results. They make their advertisements as attractive as possible, and change them frequently.

Displaying Goods.

The firm are making an effort to trim their windows more effectively than last year, and also to keep their store cleaner and more inviting and attractive in the general display of goods. Their plan is so to arrange the goods that the customer—figuratively speaking—falls over them. The firm believe that the "Don't see what



Fig. 3.—Trade Mark on Stationery, Circulars, &c.

you want, ask for it" method is obsolete. They are satisfied that if customers do not see what they want, in nine cases out of ten, they will not ask for it but forget it. The opinion is expressed that the fact that they see first prompts the question, and very often creates the want.

REQUEST FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

The Kanawha Nail & Iron Company, manufacturers' agents and jobbers of Hardware, Charleston, W. Va., have moved their offices and warerooms to 161 Clendenin street, where they have more commodious quarters and where they shall be pleased to meet the traveling fraternity. They advise us that they have been made the agents of the Frick Company, Waynesboro, Pa., for the sale and transfer of repairs for portable and traction engines, portable circular saw mills and threshers, &c., in addition to their regular line of Hardware, and continue the practice inaugurated when they began business eight years ago of discounting all bills. They will be glad to correspond with and have quotations from factories who are willing to give "rock bottom" prices for quick cash.

THE LAKE ERIE SPECIALTY MFG. COMPANY.

THE LAKE ERIE SPECIALTY MFG. COMPANY, Geneva, Ohio, have lately been organized under the laws of that State. The following are the officers of the concern: T. H. Russell, president; E. M. Converse, vice-president; V. L. Atkins, secretary; C. I. Chamberlain, treasurer, and J. H. Lyons, superintendent. The company will manufacture a line of Plumbers' Brass Goods, including Lyons' Special Patented Goods. At present they are ready to quote prices on and supply promptly Fuller Bath Cocks, Fuller Basin Cocks, Stop and Waste Cocks, Sill Cocks and compression work of all kinds. As fast as competent men can be secured and more machinery can be installed, they will increase the line on this class of goods, and bathroom fixtures in general, so as to make it as complete as any. We are advised that the company have a well equipped plant, are amply financed, and that the business is managed by experienced men, who are intending to produce a high grade of goods.

BOSS MFG. COMPANY.

THE BOSS MFG. COMPANY, manufacturers of Husking Gloves, Mittens and Pins and Canton Flannel Gloves and Mittens, at Kewanee, Ill., are establishing a branch factory at Galesburg, Ill., and will at once put in an equipment of about 40 machines. The

company have built up a very large trade in workmen's Gloves, and find that it is desirable to increase their manufacturing facilities.

HOLIDAY ADVERTISING.

Weed & Co., Buffalo, N. Y., who are progressive and skillful newspaper advertisers, are using half a page in a leading paper of their city to call attention to their line of holiday goods. The accompanying reproduction of one of their advertisements, greatly reduced, will afford an idea of the manner in which the goods are brought to the notice of the public. An object lesson is thus given in the use of small cuts, demonstrating how

 This is a detailed black and white illustration of a holiday advertisement from Weed & Co. It features several sections of goods:

- Top Left:** Text about their stock and a banner for "Presents for Everyone! At Great Bargains Friday. WEED & CO."
- Silver & Cutlery:** Shows various pieces of silverware and cutlery with their respective prices.
- ART WARES:** Displays a variety of decorative items like vases, bowls, and figurines.
- Bottom Left:** A section for cameras with descriptions and prices.
- Bottom Center:** A section for athletic equipment, including bicycles and other sports-related items.
- Bottom Right:** A section for household goods like stoves, lamps, and kitchenware.
- Bottom Left Footer:** Text about the cost of the advertisement and the address: "WEED & CO., 292 to 298 Main St., 16 to 18 Erie St."
- Bottom Right Footer:** Text about the cost of the advertisement and the address: "WEED & CO., 292 to 298 Main St., 16 to 18 Erie St."

Holiday Advertising.

effectively they may be used, accompanied by a short description and attractive prices. The endeavor to exceed the record of former years, by the firm, stated at the top, on the left, is calculated to interest the public, while the fact that some prices are for one day only, found on the opposite side, will no doubt stimulate early buying in some lines.

PETERS CARTRIDGE COMPANY.

THE demand for the products of the Peters Cartridge Company, Cincinnati, Ohio, consisting of a full line of Metallic Cartridges loaded with King's Semi-Smokeless Powder, a line of Shot Gun Shells, consisting of Shells for Smokeless, Semi-Smokeless and Black Powder, besides Primers, Wads and Shot, has been such that for some time past that company have been unable to fill their order promptly. This condition of affairs has influenced the company to make extensive alterations in their plant and to considerably enlarge their manufacturing capacity. They are now putting in additional steam boilers of large capacity, with two direct connected engines of 200 horse-power for the transmission of electric power, as well as a large electric plant. The company are also erecting two buildings of two stories in height, one 50 x 90 feet, the other 50 x 50 feet, besides a number of smaller buildings, as well as additions to the existing buildings, all of which are expected to be completed by next spring. The improvements will also include a 2,000,000-gallon reservoir, with large water mains connected with the automatic sprinkler system in the buildings, as well as a 1000-gallon underwriters' pump. The object of these improvements, besides increasing the productive capacity of the plant, is to secure the greatest prevention against fires. The company state that, besides a large increase in their home trade, there is a rapidly growing foreign demand for the Peters Ammunition.

P. & F. CORBIN.

P. & F. CORBIN, New Britain, Conn., have decided to build a large addition to their plant, in order to accommodate their increasing business, and have already placed an order with the Berlin Construction Company, Berlin, Conn., for the steel frame of the new building. The new addition will be 60 feet wide and about 200 feet long, and will be seven stories high, the highest manufacturing building in the city, if not in the State. Owing to the excessive loads which they are compelled to carry it has been decided to make the frame work of the building of steel, the construction being exactly the same as the tall office buildings in New York City. The outside walls will be of brick, but the whole supporting frame of the building will be a steel structure capable of carrying 250 pounds on every square foot of floor. The different floors of this unusually tall manufacturing building will be served by a quick acting elevator, and it is believed that the construction will be a great improvement, and that manufactured goods can be handled much more economically than in a building spreading over larger ground area. The building will be unique in construction, as there are no other manufacturing buildings in New Britain built exactly this way, but it is thought that the construction will admit of more light and more strength than the ordinary style of building, as the wall surface is made up very largely of windows, so that the interior of the building may be well lighted.

TRADE ITEMS.

As already noted in these columns, Frank Forsyth, with others, is starting a new Shovel plant at Berkley Springs, W. Va. Mr. Forsyth states that the plant will have a capacity of 100 dozen Shovels a day of the Chisholm and smooth back pattern. The Union Foundry & Machine Company of Pittsburgh are furnishing all the machinery for the new plant. The capital stock of the company is \$50,000 and the main building is 80 x 300 feet. George W. Biser is president and Frank Forsyth superintendent.

THE custom of issuing calendars has become very general among manufacturing and merchantile concerns, by many of whom a great deal of money is expended in getting out artistic productions. The Winchester Repeating Arms Company, New Haven, Conn., who have been in the habit of issuing striking and attractive calendars in past years, advise us, however, that they have decided to issue no calendar for 1902.

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The Retail Hardware Merchant's Hindrances.

The following extracts from letters received from Hardware merchants touch upon various influences which tend to interfere with the profit and success of the business:

We think one of the principal hindrances to the retailer's success is a want of system. Some merchants, so-called, never invoice, or, if they do, it is so long between invoices that there is very little to be learned from the invoice. An invoice to be of any value **Want of System.** needs to be taken every year. A merchant one time said to me, "I never invoice. I look at the shelves, and if they are as full as usual, and I have some money in the bank, I am satisfied." What kind of goods there was on the shelves did not seem to make any difference. How long they had been there, whether they were quick or slow sellers, did not seem to trouble him. The goods that get hidden away in nooks and under the counters, and become covered with a coat of dust so thick that they are almost invisible, are sometimes a large percentage of the profits of the store. A yearly invoice brings such goods to light. It is a review of the stock on hand. It tells if there are unsalable goods accumulating on the shelves. It suggests a more vigorous collection of accounts, for it tells how much of the working capital of the store is tied up, lent to the customers of the store without interest.

Another hindrance is the ordinary method of book-keeping. Goods are charged with no definite time for payment. Result of that way of doing is that accounts are not closely looked after. When the **Bookkeeping.** demand for money becomes greater than the amount of daily sales and the haphazard payment of accounts will satisfy, then an effort is made to collect outstanding accounts, but as soon as the pressure is removed further effort is abandoned. A great many accounts with this method of collecting become old, and the older they get the harder they are to collect. A large percentage of the losses from bad accounts occur in this way.

Another hindrance is the way that some merchants care for their daily cash receipts. A great many business men work faithfully and hard to build up a trade, and when sales are made throw the **Daily Cash Receipts.** money received loose in a drawer, and when night comes have absolutely no way of knowing how much money there should be in the drawer—no way of correcting errors; no way of keeping track of the work of employees; no chance for definite knowledge, so as to reward faithful service or encourage the laggard; no way of helping employees to bear up under temptation.

The department stores and catalogue houses have been doing the retail trade of the country a good deal of harm, and bid fair to do them more. They are apparently successful. Would it not be well for us, as **Worth Looking Into.** retailers, to examine into their methods and adopt, as far as practicable, what ever we find in their ways of doing business that will advance our own interests? You go into one of these big stores, and what do you see? A business so systematically arranged that every employee has a record that he makes himself. If he is faithful his record shows it. If he is not faithful his record shows that. With their system it is comparatively easy to watch, and stop, the little leaks; to keep track of the stock; to know what goods are moving and what goods are dead stock. Their system enables the head of the house to keep in touch with every part of the business. So with all the damage these big houses are doing the small trade, they are showing what can be done by thorough system.

The jobbing retailer is the principal hindrance to making the volume of our business larger. Every retail-

man knows what he has to contend with in this direction. The jobbers' association had better try and protect their own clients before asking protection from manufacturers.

As to the hindrances to the retailer's success, first comes the catalogue and bazar stores who are constantly making so-called leaders, often furnishing goods of an inferior quality **The Manipulation of Prices.** at such cut prices as are not profitable for the merchant to meet, but another great hindrance is the forming of trusts and their manipulation of prices.

So close are goods sold all over this Western country that often what seems but a slight change in wholesale prices, when it is a decline, leaves the retailer with a stock in that particular line that he must continue to sell through the season at a dead loss, and not doing as the manufacturer or jobber does when prices advance, securing the advance, but as is almost the general practice in this country, continuing to sell at old prices for fear of **Petty Jealousy of Retailers.** should he ask the advance he knows he is entitled to his competitor may not, and he will lose his customer. That the petty jealousy of retailers is to blame largely for this last condition is evident, and the smaller the town and smaller the dealers the more this condition exists.

The principal barrier to the average retailer's success is lack of capital. The day has arrived when a man with a set of Tinner's Tools, a few kegs **The Need of Capital.** of Nails, a small stock of Cooking Utensils and Builders' Hardware, cannot expect to pay living expenses, business expenses and accumulate a competency, except under very exceptional conditions. This is due not to department store competition, but to the vast number of new lines that are constantly coming into use, and which seem properly to be classed under the head of Hardware. At Hardware conventions we hear about Hardware stores adding groceries or some such thing to their regular business in order to secure a satisfactory trade,

but when I hear such theories **The Expanding Hardware Field.** advanced I wonder why the advocate of such a procedure does not add something in the Hardware line instead. I doubt if in the United States there is a retail Hardware store that could not add some new line of some branch of Hardware to its stock that would bring better results at the end of the year.

The Hardware associations are trying to correct some of the evils that menace the retailer, but they can do very little until the retailer shows a desire and determination to help himself.

Jobbers selling to consumers and catalogue houses soliciting business at your very door are the barnacles that may destroy the retailer.

There is a remedy and every retailer does or ought to know what that remedy is—i. e., to confine his purchases to those people who really are assisting them in their fight against illegitimate competition.

No retail dealer has a moral right to buy a dollar's worth of merchandise from any jobber or manufacturer who is listed in the book sent out by the secretaries of the State associations as "unfavorable" to the retailers.

When he does buy of these truant jobbers he is tearing down the wall and letting in the flood waters that will sooner or later engulf him, and why does he do it? Simply because he holds the cent so close to his eye that he cannot see the dollar lying at his feet.

To explain more fully, this dealer, whom we will call Jones—is in the market for some Corn Ties. Their market value is \$1.50, and that is what **Method of the Jobber.** his jobber who is loyal to the association "Unfavorable" asks for them. The jobber who is listed as "unfavorable" is asked for a price, and he, knowing that he is so listed and that the dealer is a member of a State

Hardware association, quotes him a price of \$1.40 and he gets his business and incidentally sells him other goods. Then that jobber laughs to himself and remarks upon the worthlessness of the power of the Hardware association until the jobber who has stood by the Hardware association cannot be blamed if he feels that his efforts to help the retailer are not appreciated.

One of the hindrances to our success is, of course, the department stores of the larger cities. It is our idea that many of our customers have compared their prices with ours, and consequently purchased goods from these stores which in many instances have proven worthless stuff. We believe that if there was some way of reaching the people who run these department stores and preventing them from making such a slaughter in prices, there would be much more Hardware, Tinware and Cutlery sold throughout our country than at present. This, however, we presume is an impossibility, as we have no idea that they could possibly be reached in any way.

Another hindrance, but not of much account, is a little shortage of money in the pockets of the farmers of this section.

The catalogue house question is becoming more and more serious, and the only help to be looked for is a thorough combination of retailers in the Interstate Association and a combined effort of retailer and jobber, through their national associations, to correct the difficulty.

I wish I could make the retail dealer appreciate the importance of joining the State retail association. He is between "the devil and the deep sea," to put it tersely. The jobbers have a

The Need of Retail Organization. magnificent organization, that enables them to say even to the big consolidations: "You make a certain differential for jobber in car lots and retailer in car lots." And they toe the line, and if there were no better illustration of the benefits of organization than what it has done for the jobber, any retailer who would just stop in his mad rush for wealth to think one good hard thought would see the point.

I leave it to the reader to designate which is the devil and which the deep sea; but there are certain very big institutions who are trying to convince the manufacturers that they buy many lines as largely as jobbers and are entitled to jobbers' prices.

Now here is the point. If retailers fail to organize and stand shoulder to shoulder, the jobbers use their power to look out for number one; realize a handsome profit on their sales; give the retail dealer his goods at a stiff cost and let him hustle to meet his cut throat competition. The retailer is the one to have the night sweats and do the figuring to hold his own.

But if retailers are thoroughly organized, then what? Jobbers' organization wakes up and helps the retailer, or we can try co-operative buying on a national scale.

Improving the Retailer's Position. Then jobber's profit is cut and he is the one to do the figuring. Neither of the above extremes is desirable, but with thorough cooperation and organization of the retail dealers and a firm stand taken with both manufacturers and jobbers for what is fair and right to protect his interests, the position of the retail dealer, instead of steadily getting worse from year to year, as it is sure to do if we do not organize thoroughly, will just as surely improve and get better—and very much better.

There is not a retail dealer in the United States today doing an annual business of \$10,000 or more who could not improve his financial condition \$100, besides

Financial Value of Hardware Conventions. his expenses, by attending a retail Hardware dealers' convention. If he is lazy and shiftless in his methods, it will make him a hustler. If he is too venturesome, it will make him more careful. No man can rub up against 50 or 100 other retail dealers without improving himself to a great extent. The Interstate Association has already doubled the power of every State association,

We depend upon the agricultural interests, and in our community have a good degree of prosperity. Prices are good, we might say high, for nearly everything the farmer has raised this season. Yet we believe that the farmer has not purchased at home in proportion to his resources.

Keeping Trade at Home. One of the principal hindrances with which we have to contend is the ordering from catalogue houses, which has become quite general during the past five years.

We issue illustrated price-lists of staple goods at least once a year, and try to command more of the trade going outside, and thus far we have good results.

PENNSYLVANIA RETAIL HARDWARE DEALERS' ASSOCIATION.

The Pennsylvania Retail Hardware Dealers' Association was organized at a meeting held at the Monongahela House, Pittsburgh, on the 12th inst. The entire proceedings were characterized by a unity of purpose and resolution, and the testimony was clear that an organization should be established for mutual protection. About 35 merchants were in attendance.

The meeting was held under the auspices of the Monongaheia Valley Retail Hardware Dealers' Association and was called to order by President G. L. Moore of Brownsville, who stated the object of the meeting, closing his remarks with a brief history of the sectional organization. The forenoon session was taken up chiefly with short discussions on existing conditions and proposed remedies. On reassembling in the afternoon M. L. Corey, secretary of the National Retail Hardware Dealers' Association, gave an interesting and very instructive talk on the Indiana State Association, the difficulties it encountered, how some of them were overcome, while others were still unsolved. He urged a united effort to bring about a solution of many difficult problems that beset the trade, giving some illustrations of marvelous results wrought by a steadfast and united effort. He pointed out that organization unites socially, a friendly feeling being thus engendered, which dissipates the deadly competition that often arises through misunderstanding. At the close of his remarks one purpose seemed to animate those present, and that was to establish an organization that all might reap the benefits that have come so freely to those already in the fold. Some discussion arose as to the name of the new association. As the representation was from the Western end of the State it was thought the name of Western Pennsylvania Retail Hardware Dealers' Association would be appropriate. Others thought the scope of the organization should embrace the entire State, and the following resolutions were adopted:

Resolved, That this association be known as the Pennsylvania Retail Hardware Dealers' Association, and that its membership include retail Hardware dealers exclusively.

Resolved, That we affiliate with the National Retail Hardware Dealers' Association.

The following officers were elected:

G. L. Moore, president, Brownsville.
Geo. J. Rudolph, vice-president, Pittsburgh.
J. F. Frye, secretary, Charleroi.
B. A. Maggini, treasurer, Braddock.

EXECUTIVE COMMITTEE.
A. Q. Casselberry, Pittsburgh.
E. E. Lyon, Greensburg.
C. N. Savage, California.
B. A. Maggini, Braddock.
C. O. Shroyer, Dawson.

The association then adjourned to meet on the second Wednesday in February at the Monongahela House, Pittsburgh. This date is, however, subject to change.

It is gratifying thus to note that the retail Hardware merchants of the great State of Pennsylvania have swung into line for self defense by means of an association, and it is hoped that the present membership may be largely augmented before the next meeting in February. Any information desired in regard to the association will be cheerfully furnished by Mr. Frye, the secretary.

NEW ENGLAND HARDWARE DEALERS' ASSOCIATION.

In accordance with an annual custom the monthly meeting of the New England Hardware Dealers' Association, which was held at the United States Hotel, Boston, Wednesday, December 11, was observed as the anniversary of ladies' night. Once a year the members of this association entertain the ladies at dinner. For this occasion the Entertainment Committee—D. Fletcher Barber, Henry M. Saunders and James A. Farless—provided a programme of exceptional interest. The guests assembled in the parlors of the hotel between 5 and 6 p.m., where a reception was held by S. D. Balkam and Mrs. Balkam, representing the association; Lieutenant-Governor John L. Bates, representing the Commonwealth of Massachusetts; Mrs. Katherine Lente Stevenson, president of the Massachusetts W. C. T. U., and Rev. George R. Grose. During the reception and throughout the dinner hour music was furnished by the Ladies' Schubert Orchestra. The Reception Committee—Samuel H. Thompson, Lowell; E. C. W. Bliss, Boston; Henry M. Sanders, Boston; George J. Mulhall, Boston; E. Loring Richards, Boston; L. W. Thompson, Woburn; John B. Hunter, Boston; James P. Mackey, Brookline; Thomas H. Baldwin, Boston—introduced the guests, and



at 6 o'clock the company sat down to dinner. At the close of the banquet First Vice-President S. D. Balkam, who presided in the absence of President George W. Burditt, who was detained by illness, delivered the following address of welcome, in connection with which he related several entertaining stories:

Mr. Balkam's Remarks.

Owing to the illness of our president it becomes my duty and gives me great pleasure to extend to you, our lady guests, a most cordial welcome to this the ninth annual banquet of our association. It gives me pleasure because you are enabled to see what manner of men we are who are in the Hardware business. Our calling is often hard and very wearing, yet we have times of reposing, and to-night is certainly one of our times of rejoicing. It is because of your presence that we have with us our highly esteemed Lieutenant-Governor, the Hon. J. M. Bates; also our honored friend, Mrs. Stevenson, one of the pioneer workers in the temperance cause. Such privileges are not accorded at our ordinary meetings, which are held seven months in the year, some of which are very interesting and some are not, but we are always confident that ladies' nights will be a success. In closing this reminds me of the story of a colored preacher, who, at the funeral of a brother, spoke something as follows: "Friends, we are gathered to-day in great affliction. Death has taken our brudder, leaving us in great mystery. We are full of doubts and fears, not knowing the future. Some says he was a good man, some says he was a bad man, some says he's gone to

heaven, some says he's gone to the other place; so we are still full of doubts and fears. But, bless the Lord, in all our sorrow, doubts and fears, we have one great consolation—we know he's dead."

Address of Charles E. Adams.

At the close of his address Mr. Balkam introduced Charles E. Adams of Lowell, who acted as toastmaster. Mr. Adams spoke as follows:

In behalf of the New England Hardware Dealers' Association I extend a cordial welcome to our guests, representing the State government, the Christian Temperance Union and the clerical profession, and indulge in the hope that the enjoyment we receive by their presence may in some measure be imparted to them.

To the ladies who honor and grace the occasion we express our deep appreciation for two reasons: First, that it is gratifying to the members to have the ladies interested in our association, and, also, as woman is man's conscience, it is a good thing for a man always to have his conscience with him.

Victor Hugo well said that the nineteenth century was the woman's century, and incidentally it can be stated that Massachusetts women performed their part in creating its history. To-day there is not a reform of any magnitude that is not receiving the attention of these modern mediums for the education of the public, known as women's clubs, and whose influence, I believe, will in the immediate future exceed any other in advancing the moral welfare of mankind.

An "ideal place" is the planet Mars, where the people have no competition, no trials or tribulations, no government, all brothers and sisters of one great common family, at peace with the outside world as well as their own planet. We have not quite reached that condition upon this mundane sphere, but are making progress, which, if followed to a conclusion, may place us in such delightful surroundings.

Edward Bellamy's looking backward from the year 2000 seems to-day almost in the light of prophecy. You will recollect he mentions the conduct of business by large aggregations of capital, and resistance by the people until finally they recognized and accepted the process as a logical evolution necessary to open a golden future for humanity.

Individuality is to-day practically lost, except in isolated instances; aggregate effort is the factor that dominates the commercial and industrial world, but the inevitable result will be a tendency to a closer control by the people.

Municipalities in the old world are rapidly assuming control of quasi-public corporations, and in this country agitation has already commenced which will place the ownership of heat, light and power plants in many of our cities and towns in municipal control, and the United States will have governmental supervision over the Interstate transportation, telephone and telegraph lines.

The world is growing better every day, and I believe these great international expositions are doing magnificent work in advancing the social, ethical and material welfare of all nations.

The Parliament of Religions held at the Chicago Columbian Exposition, where the greatest exponents of the religious truths of all ages and climes earnestly defended their interpretations, with the utmost harmony prevailing throughout the session, it is believed exerted a powerful influence in elevating the standard of honor, integrity and tolerance throughout the world, and gave fresh impetus to the channels of trade and commerce by a new presentation of that great abiding truth—the brotherhood of man.

Other Speakers

Mr. Adams then presented Lieutenant-Governor John L. Bates, who extended the greetings of the Commonwealth, and in the course of his address made some pertinent allusions to the Hardware business, referring to the time, not so remote, when the ordinary type of modern hand Agricultural Implements were first introduced into this country by immigrants, and described how

these Hoes and Forks were soon imitated and later improved by the country blacksmiths of Connecticut, and from whom, by a rapid process of evolution, the modern Hardware manufacturer developed.

The next speaker was Rev. George R. Grose of Newton, whose topic was "The Christian Virtues in Business."

The principal address of the evening was made by Mrs. Stevenson, whose subject was "Twentieth Century Problems." Mrs. Stevenson spoke of social problems in a hopeful vein, referring particularly to the higher standards which now prevail in the business world and to the fact that a premium is put upon a clear brain and strong body free from the baneful influences of narcotics. Although the speaker is most prominent in temperance work, her view of the subject as given on this occasion was broad and liberal, and expressed in most graceful language.

An address, "Art in Hardware," which was on the programme, was omitted owing to the absence of O. E. Brandt of Russell & Erwin Mfg. Company of New York, who at the last moment was obliged to send a telegram of regret.

Between the addresses a cornet solo by Miss Damon and a violin obligato by Miss Deul were given. After the regular programme had been finished E. J. Neale of Lowell read a letter from President George W. Burditt, in which Mr. Burditt expressed his regret at not being able to be present. In referring to the letter and the president's illness many expressions of sympathy were made, and on motion of Mr. Neale a resolution of sympathy was passed and ordered forwarded to Mr. Burditt.

The next monthly meeting of the association occurs in February, and at that time the annual election of officers will be held. Charles E. Adams of Lowell, who is president of the Massachusetts State Board of Trade, as well as a member of the New England Hardware Dealers' Association, was unanimously elected to represent the latter organization in the State Board for three years.

In accordance with a provision of the by-laws the acting president announced Samuel H. Thompson, William D. Parlin and Edward A. Loomis as a committee to report at the next meeting a list of names for all offices excepting that of president. This brought the exercises to a close.

The evening was a success in every respect, the attendance being about 75. The banquet in all its appointments and the arrangements in every detail were perfect, for which the several committees are entitled to great praise, among whom ex-President D. Fletcher Barber and Secretary Farless were indefatigable in their efforts.

SOUTHWESTERN KANSAS AND OKLAHOMA IMPLEMENT AND HARDWARE DEALERS' ASSOCIATION.

The second annual meeting of the Southwestern Kansas and Oklahoma Implement and Hardware Dealers' Association was held in Wichita, Kan., on the 4th and 5th inst. in the council chamber of the City Hall. S. H. Myton of Winfield, Kan., occupied the chair, and a large number of members were in attendance. Among the papers read at the convention were those by B. B. Breed of the Studebaker Bros. Mfg. Company, South Bend, Ind., on "The Relations of the Dealer and manufacturer from a Traveling Man's Standpoint," and by D. W. Blaine of Pratt, Kan., on "The Supply and Demand for Prison Binder Twine, from a Dealer's Standpoint." The following officers were elected for the ensuing year: President, Charles Watson, Pond Creek, Ok.; vice-presidents, John Baumstark, Harper, Kan.; S. H. Myton, Winfield, Kan. Directors: F. M. Spangler, Mulhall, Ok.; W. H. Hubbard, Conway Springs, Kan.; Henry Noble, Alva, Ok.

J. C. McGeary has disposed of his business at Leechburg, Pa., to the Leechburg Hardware Company.

NORTH DAKOTA RETAIL HARDWARE ASSOCIATION.

The Executive Committee of the North Dakota Retail Hardware Association have decided to hold the next, the fifth, annual meeting of the association in Fargo, February 19 and 20, 1902.

WABASH SCREEN DOOR COMPANY.

THE WABASH SCREEN DOOR COMPANY, Marquette Building, Chicago, are doing everything possible to supply the deficiency in their output resulting from the recent burning of their large factory at Rhinelander, Wis. Their factory at Memphis, Tenn., is fortunately in operation. The president of the company is arranging to secure an idle plant in the Northwest, which will immediately be stocked with the necessary machinery. The day after the fire, Screen Door and Stove Board machinery was at once ordered so as to be able to equip any available factory as speedily as possible. It is hoped to have a plant of this kind in operation by January 1. By running the Memphis plant night and day and adding the output of the emergency factory the company believe that they will be able to take care of their trade much better than had been expected. They are confident they will be in shape to make Stove Boards earlier than ever and in larger quantities. They have requested their customers to cut down the line of fancy Doors usually purchased, and in this way make it somewhat easier to supply the general trade. The company are greatly pleased with the expressions of sympathy which have been received from Hardware merchants in all parts of the country. The managers of the company are very energetic and assure the trade that they will do everything possible to supply their wants.

THE FRANKLIN GALVANIZED WARE MFG. COMPANY.

THE FRANKLIN GALVANIZED WARE MFG. COMPANY, Franklin, Ind., have lately been incorporated with the following officers: P. W. Payne, president; D. A. Forsyth, vice-president; W. B. Jennings, secretary; A. F. Curtis, treasurer, and W. H. Universaw, manager. The office, factory and warehouse of the company are nearing completion. Nearly all their machinery has been contracted for, and they will begin installing it about December 23. They purpose to manufacture nearly all kinds of Galvanized and Japanned Ware from the sheets—that is, Galvanized Steel Tanks, Tubs, Buckets, Half Bushel Measures and various other articles, including the filling of special orders for heavy Galvanized Steel Tanks. The company expect to have their plant ready for operation about January 15, 1902.

THE FEDERAL BOILER & SUPPLY COMPANY.

THE FEDERAL BOILER & SUPPLY COMPANY have been incorporated under the laws of New Jersey, with a capital of \$3,500,000. The new company are a practical consolidation of the Kellogg-Mackay-Cameron Company of Chicago; the Kewanee Boiler Company of Kewanee, Ill.; the Model Heating Company of Philadelphia and Uniontown Acme Radiator Company of Uniontown, Pa. The principal office of the new company will be in New York City. The directors of the company are: E. E. Baker, Clarence V. Kellogg, W. H. Pfahler, B. F. Baker, A. C. Mott, J. P. Dugger, James Mackay, W. A. Cameron, E. P. Mott, L. G. McCrum and W. D. Kellogg. The officers of the company are: Clarence V. Kellogg, president; W. H. Pfahler, vice-president, and B. F. Baker, treasurer. The business of each of the concerns included will be managed separately as heretofore, so far as the solicitation and shipment of orders are concerned.

H. Pfeiffer & Son, successors to J. C. Peters & Co., Fort Wayne, Ind., are jobbers and dealers in Builders' and Shelf Hardware. They have two salesmen on the road, who cover Indiana, Ohio and Michigan territory.

PRICE-LISTS, CIRCULARS, &c.

WITTE HARDWARE COMPANY, St. Louis, Mo.: Catalogue embracing Guns, Rifles, Revolvers, Ammunition and Sporting Goods. The catalogue contains 135 pages, illustrated, with prices. The company state that they will furnish on request a net price-list to dealers only, to whom they sell exclusively.

DODGE, HALEY & CO., Boston, Mass.: A book of nearly 400 pages, entitled "Heavy Hardware Reference." It is a catalogue of iron, steel and Heavy Hardware, Blacksmiths', Machinists' Contractors' and Railroad Supplies, of which they are importers, jobbers and manufacturers' agents.

KING HARDWARE COMPANY, Atlanta, Ga.: A special catalogue of 203 pages, representing the full and complete line of Mechanics' Tools which they carry in stock.

THE WISCONSIN REFRIGERATOR COMPANY, Eau Claire, Wis.: Catalogue of the Wisconsin Peerless and Badger Refrigerators. These Refrigerators are made with a cleanable flue wall. This consists of a square hollow device attached to the center and inner side of the wall, forming a flue within a flue, thus aiding in the rapidity of the circulation. These side flues can be removed to be cleansed as desired. Specially designed fittings are used, such as a special form of ice rack and an efficient drain pipe and drip cup. The Peerless line occupies 52 pages of the catalogue, and is shown in a full variety of styles covering all constructions, including Sideboards for domestic use and large sizes for grocers and butchers. The last ten pages of the catalogue illustrate the Badger line, which is a well finished style of Refrigerators offered at a somewhat lower price.

THE T. C. PROUTY COMPANY, Albion, Mich.: Catalogue illustrating the No. 4 Prouty Door Hanger. The Prouty Hanger has a round top track constructed of sheet steel, having the lower edges turned in so as to form a double track to support wheels on each side of the Hanger, which is constructed with two wheels at each end. This Hanger and track are so constructed that they can be adjusted to make sliding doors stand true, even though one jamb may be out of line with the other. The track has a flexible joint in it, and every joint is staggered so that the opposite wheels are not on the joint at the same time. The catalogue is a specimen of beautiful book work.

THE STANDARD WELDING COMPANY, Cleveland, Ohio: Price-list relating to their Seamless Steel Tubes, Rims, Cylinders and Boiler Flues for automobiles and other purposes.

LEE-GLASS-ANDREESSEN HARDWARE COMPANY, Omaha, Neb.: Catalogue of nearly 250 pages devoted especially to their line of Builders' Hardware. It is finely printed, and presents their line in an attractive and satisfactory manner. A well executed picture of their new and spacious establishment appears as a frontispiece.

CALENDARS, &c.

HARRINGTON & RICHARDSON ARMS COMPANY, Worcester, Mass.: Calendar for 1902, containing a *fac-simile* of a pastel drawing of "The Hunting Girl." They will be pleased to mail copies without charge to those who mention *The Iron Age* when writing.

ALMON H. FOGG & CO., Houlton, Maine, jobbers and retailers of Hardware, &c.

MAIN BELTING COMPANY, Philadelphia, with branch office at 55 and 57 Market street, Chicago, manufacturers of Leviathan Belting.

THE IRONSIDES COMPANY, manufacturers of the Ironsides Paints, &c., Columbus, Ohio: Nickel Plated Celluloid Match Box.

WALTER A. ZELNICKER, 208 North Third street, St. Louis, manufacturer of Ring and Chain Dogs, Long Link Conveyor Chain, Prepared Roofing, &c., and dealer in Mill and Factory Supplies, Railroad Equipment, Heavy Hardware, &c.: A large calendar for 1902 and celluloid pin tray.

THE MARLIN FIRE ARMS COMPANY, New Haven, Conn.: An attractive lithographed desk calendar which they will be pleased to send to any on receipt of one stamp to defray postage.

AMONG THE HARDWARE TRADE.

McDOWELL & GRAVES are successors to McDowell & Pettigrew in the wholesale and retail Hardware, Stove, Farm Implement and Buggy and Wagon business in Cabool, Mo.

RIPON HARDWARE COMPANY, Ripon, Wis., have been organized and have bought the stock of Shelf and Heavy Hardware, Stoves, Tinware, Sporting Goods, Furnaces, &c., formerly carried by Charles Cowan.

BARE BROS. have succeeded Remy & Bare Bros., wholesale and retail Hardware, Mansfield, Ohio, and will continue the business at the old stand.

M. B. MARSHALL has purchased an interest in the Hardware business of Thompson Bros., Malone, N. Y., and the style has been changed to H. D. Thompson & Co. The firm advise us that they are improving their facilities for the prompt shipment of orders. They have also increased their capital and enlarged their stock, and are giving particular attention to the jobbing end of the business, putting an additional salesman on the road.

HAWKINS HARDWARE COMPANY have purchased the business formerly conducted by Hanson & Son, Vermilion, S. D.

H. J. STUCHBERY has lately opened up a new stock of Hardware, Stoves, Sporting Goods and furniture in Ringwood, Oklahoma.

JONES, BYRD & CO. are a new Hardware concern at Limestone, Tenn., handling in addition to Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Cement, Lime, &c.

J. E. FARRELL, Hyde Park, Mass., has recently taken possession of his new building. His line comprises Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Sporting Goods, Seeds, &c. Mr. Farrell reports a satisfactory business, with a promising outlook for the future.

KOLP HARDWARE COMPANY, Hobart, Oklahoma, have recently embarked in business at that point, handling both Shelf and Heavy Hardware, Stoves and Agricultural Implements.

FRISBEE & SAXTON have succeeded Sharp & Frisbee in the Hardware and Stove business in Long Beach, Cal.

WATERMAN HARDWARE COMPANY, Geo. Waterman, president and treasurer, Albany, N. Y., have lately opened a new store at 141 South Pearl street. They are carrying a full line of Hardware, Tools, Kitchen Utensils, &c.

A. M. BANNARD has sold his Hardware, Stove, Farm Machinery, Wagon, Buggy and furniture business, at Brownsville, Ore., to J. W. Ross, who will continue at the old stand. Mr. Bannard has acquired the furniture business of M. Wilbur, Grant's Pass, Ore., and expects later to enlarge it and add the sale of Stoves and General House Furnishings.

The Eureka Step Ladder

The step ladder shown herewith is offered by John S. Tilley, Watervliet, N. Y. The ladder has a special style of hinge, connected front and back, bolted on, rodded and well braced with iron braces. The ladder is also made with the open back, as shown in the detached cut to the right, which is preferred, it is stated, by most painters, as it admits using a plank to make a platform more readily. The ladder is also made with a pail rest. The manufacturer explains that the ladder is particularly adapted for painters, carpenters, fruit picking and mill

December 19, 1901

use, or in fact wherever a durable step ladder is required. It is pointed out that the ladder fills all the requirements of a first-class article, and is not cumbersome. It is

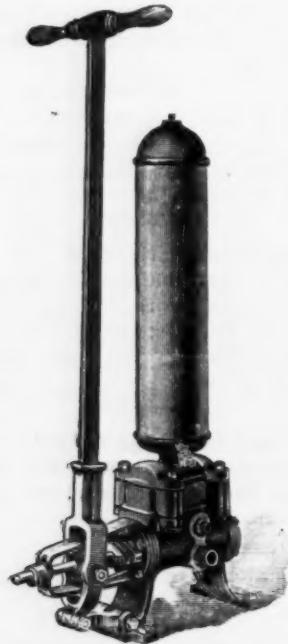


The Eureka Step Ladder.

made in eight sizes, from 5 to 12 feet, in even foot lengths.

Goulds' Sentinel, Jr., Double Acting Spray Pump.

The Goulds Mfg. Company, Seneca Falls, N. Y., are offering the double acting spray pump illustrated herewith. It is designed especially for the requirements of



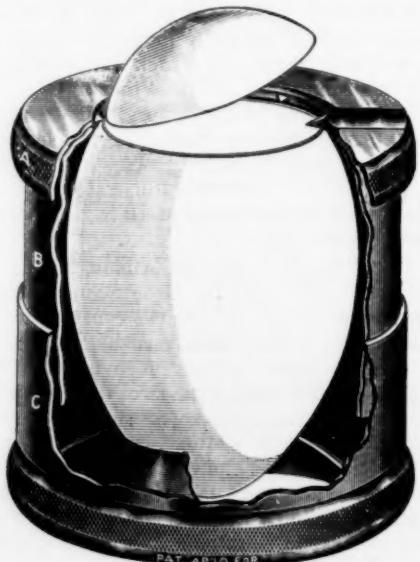
Goulds' Sentinel, Jr., Double Acting Spray Pump.

orchardists and orange growers desiring quick work at high pressure. Notwithstanding the large capacity of the pump, it is remarked, one man can operate it constantly against over 100 pounds pressure without undue

effort. It is explained that the pump is often used with six nozzles on the end of one extension pipe; also with several leads of hose. It is pointed out that the piston is easily and quickly repacked; that all valves are easily accessible; that the piston, piston rod, valves, valve seats and cylinder lining are brass; that the piston rod

Combination Egg Cup and Cutter.

The Edmonds-Metzl Mfg. Company, 778 to 784 West Lake street, Chicago, have just brought out the Combination egg cup and cutter, herewith illustrated. It is intended for table and kitchen use, for handling eggs neatly, whether raw or boiled. It makes a clean cut through the shell and avoids holding the egg in the hand. The device consists of three parts, which are lettered in the accompanying illustration. The egg is placed in the holder C, with the small end down. It is next covered by the cap B, which is firmly pressed on the top of the egg and has three needles or projections

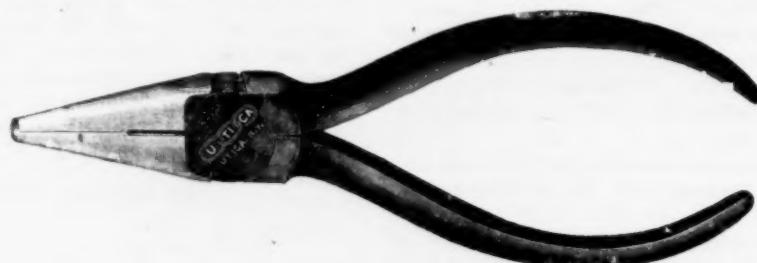


Combination Egg Cup and Cutter.

at equal parts of its circumference, which pierce the shell. The cover A is then set on top. This cover has a knife blade, which is forced into the shell, and the cover being revolved, makes a clean cut through the shell, enabling the top of the shell to be lifted off.

Side Cutting Long Nose Plier No. 622

The Smith & Hemenway Company and the Utica Drop Forge & Tool Company, 296 Broadway, New York, are putting on the market the side cutting long nose plier herewith illustrated. The advantages claimed for the plier are that having a long, narrow nose it can be used in deep, narrow quarters in which an ordinary



Side Cutting Long Nose Plier No. 622.

effort. It is explained that the plier is often used with six nozzles on the end of one extension pipe; also with several leads of hose. It is pointed out that the piston is easily and quickly repacked; that all valves are easily accessible; that the piston, piston rod, valves, valve seats and cylinder lining are brass; that the piston rod

tool would not work; that it will do the work of a regular tool and that it is convenient to carry. Every tool, it is remarked, is carefully tested at the factory before being sent out. The plier is referred to as being adapted to the use of telephone manufacturers, machinists, engineers, electricians and jewelers.

Current Hardware Prices.

REVISED DECEMBER 17, 1901.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus $33\frac{1}{3}@\mathbf{33\frac{1}{3}}&10\%$ signifies that the price of the goods in question ranges from $33\frac{1}{3}$ per cent. discount to $33\frac{1}{3}$ and 10 per cent. discount.

Adjusters Blind-

Domestic, $\frac{1}{2}$ doz. \$3.00.... $33\frac{1}{3}@\mathbf{33\frac{1}{3}}&10\%$
North's—See Fasteners, Blind.

Window Stop-

Fees' Patent..... $25&55$
Fife's Perfection..... 35

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American

Armand Hammer, Wrought, $\frac{1}{2}$ lb \$8.40-\$84.00
Bel Plateau Trenton..... 4 lb \$9.40-\$94.00
Eagle Anvils..... 4 lb \$7.40-\$74.00
Hay-Budden, Wrought..... 4 lb \$9.40-\$94.00
Horseshoe brand, Wrought..... 4 lb \$9.40-\$94.00

Imported—

Peter Wright's..... $91&94$

Anvil, Vise and Drill—

Anvil, Falls Co., \$18.00..... 20%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'

Hall Bros. Co.:
Lots of 1 doz..... 25%
Smaller Lots..... 30
Lots of 3 doz..... 35

Augers and Bits—

Com. Double Spur..... $70@70&10\%$

Boring Machine Augers..... $60&10@70&10\%$

Cur Bits, 12-in. twist..... $60@60&10\%$

Jennings' Pattern..... $40&10$

Auger Bits..... $50&10@50&10\%$

Ford's Auger and Carb Bits..... $40&10\%$

Forster Pat. Auger Bits..... 25%

C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list..... 40%

No. 30, R. Jennings' list..... 50%

Ullin Jennings'..... $25&50@10&25$

Hommedieu Car Bits 15&10@15&10

Say's Counterbore Bits..... 45

Pugh's Black..... 20

Pugh's Jennings' Pattern..... 35

Ullin's Auger Bits..... 60

Ullin's Bell Hangers' Bits..... $50&10\%$

Ullin's Car Bits, 12-in. twist..... 60

Wright's Jennings Bits (R. Jennings' list)..... 50%

Bit Stock Drills—

Standard List..... $65@65&55$

Expansive Bits—

Clark's small, \$18; large, \$26..... $50&10\%$

Argote's Clark's Pattern, No. 1, $\frac{1}{2}$ doz. \$20; No. 2, \$18..... $50&10\%$

E. Jennings & Co., Steer's Pat..... $35&45$

Wain's..... 45

Gimlet Bits—

Common Double Cut, gro. \$2.25@2.75

German Pattern.....gro. \$3.25@4.50

Hollow Augers—

Donney Pattern, per doz. \$1.00@1.50

James..... $25&10\%$

New Patent..... $35&10\%$

Universal..... 20

Vod's Universal..... 25

Ship Augers and Bits—

ord. 40

self. 40

E. Jennings & Co. 40

L'Hommedieu's $15&10\%$

Wain's 40

Awl Hafts, See Hafts, Awl.

Awls—

Handled.....gro. \$2.75@3.10

Unhandled, Shouldered, gro. \$5.65@6.50

Unhandled, Patent.....gro. \$6.75@7.00

Awls:

Unhandled, Patent.....gro. \$1.50@4.00

Handled, Socket, gro. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.**Axes—**

First Quality, best brands, \$5.50@5.75

First Quality, other brands, \$5.25@5.50

Jobbers' Species Brands:

Good Quality.....\$4.50@4.75

Best Quality.....\$5.00@5.25

Handled Axes.....\$5.50@5.75

Handled, add 25¢ doz.

Axle Grease—See Grease, Axle.

Cut Prices.—In the present condition of the market there is a good deal of cutting of prices by the jobbing trade, whose quotations are often lower than those of the manufacturers.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (April 4, 1901), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Axes—

Concord, Loose Collar.....\$4.50@5c

Concord, Solid Collar.....\$4.50@5c

No. 1 Common.....\$4.50@5c

No. 1 1/2 Com. New Style.....\$4.50@5c

No. 2 Solid Collar.....\$4.50@5c

Nos. 11 to 14.....\$4.50@5c

Nos. 15 to 18.....\$4.50@5c

Nos. 19 to 22.....\$4.50@5c

\$5 cash 10 days.

Boxes, Axle—

Common and Concord, not turned.....

lb. \$4.50@5c

Common and Concord, turned.....

lb. \$4.50@5c

Half Patent.....\$4.50@5c

Balances—

Caldwell's Sash—

Caldwell's New list.....\$50

Pullman's.....\$50

Spring—

Spring Balances.....\$4.50@5c

Chatillon's.....\$4.50@5c

Light Spring Balances.....\$4.50@5c

Straight Balances.....\$4.50@5c

Circular Balances.....\$4.50@5c

Large Dial.....\$4.50@5c

Pouze.....\$4.50@5c

Barb Wire—

See Wire, Barb.

Bars—

Crow—

Steel Ormecbars, 10 to 40 lb., per lb.

\$3@5c

Beams, Scale—

Scale Beams, List Jan. 12, '92, \$4.50@10%

Chatillon's No. 1.....\$4.50@10%

Chatillon's No. 2.....\$4.50@10%

Beaters—

Egg—

Standard Co.:
No. 5 Steel Handle Dover.....\$4.50

No. 10 Case Handle D. over.....\$4.50

No. 10 Steel Handle Dover.....\$4.50

No. 15 Ex. Hy. Steel Hd.\$4.50

Rival.....\$4.50

Taplin Mfg. Co.:
No. 69 Improved Dover.....\$4.50

No. 75 Improved Dover.....\$4.50

No. 75-3 Imp'd Dover, Tin'd.....\$4.50

No. 100 Improved Dover, Tin'd.....\$4.50

No. 102 Improved Dover, Tin'd.....\$4.50

No. 150 Improved Dover, Hotel.....\$4.50

102 Imp'd Dover, Hotel, T'd.....\$4.50

Lyon's, Standard size.....\$4.50@1.75

Wonder (S. & C. & Co.).....\$4.50@1.75

Bellows—

Blacksmith, Standard List, 70@70&10%

C. E. Jennings & Co., Blacksmith, \$4.50@10%

C. E. Jennings & Co., Hand.....\$3.50

Blacksmiths—

Inch... 30 32 38 36 38 40

Each... \$3.50 3.75 4.25 4.50 5.50 6.15

Extra Length:

Each... \$4.00 4.50 5.10 5.50 6.00 7.50

Molders—

Inch... 9 10 11 12 14 16

Doz... \$4.75 7.25 8.50 9.50 14.00 15.50

Net Prices.

Door—

Hand—

Inch... 6 7 8 9 10 12

Doz... \$3.75 4.25 4.50 5.00 5.75 6.75

Bells—

Cow—

Ordinary goods.....\$7.50@5c

High grade.....\$7.00@5c

Jersey.....\$7.50@5c

Texas Star.....\$5.00

Door—

Hand—

Polished.....\$6.00@5c

White Metal.....\$5@5c

Nickel Plated.....\$5@5c

Swiss.....\$6.00@5c

Silver Chime.....\$5@5c

Miscellaneous—

Farm Bells.....\$6.00@5c

Steel Alloy Church and School Bells.....\$5@5c

National Bell Foundry Co.: Superior Cast Steel Church and School

Bells.....\$5@5c

Wilmett & Hobbs Mfg. Co., Gongs.....70s

Belt—

Rubber—

Agricultural (Low Grade). 75@10@50%

Common Standard.....75@7.5@10%

Standard.....70@7.5@10%

Extra.....\$60@10@50%

High Grade.....\$60@10@50%

Boston Belting Co.: Boston Belting.....\$4.50@5c

Boston Belting.....\$4.50@5c

Seamless Stitched, Imperial.....\$4.50@5c

Boston.....\$4.50@5c

Nagara.....\$4.50@5c

Leather—

Extra Heavy, Short Lap.....\$0@10@5c

L

Tire—

Common.....\$7.50

Norway Iron.....\$0@20@5c

Norway Phila., List Oct. 16, '94.....\$2.50

Eagle Phila., List Oct. 16, '94.....\$2.50

Bav State, List Dec. 28, '93.....\$2.50

Franklin Moore Co.:

Franklin Moore, List Oct. 16, '94.....\$2.50

Eagle Phila., List Oct. 16, '94.....\$2.50

Eagle Phila., List Dec. 28, '93.....\$2.50

Eclipse, List Dec. 28, '93.....\$2.50

Port Chester Bolt & Nut Company Empire, List Dec. 28, '93.....\$2.50

Empire, List Dec. 28, '93.....\$2.50

Keystone Phila., List Oct. '94.....\$2.50

Norway Phila., List Oct. '94.....\$2.50

Upson Nut Co.:

Tire Bolts.....\$7.50

L

Caps, Oil—

Buffalo Family Oil Caps:

3

5

10 gal.

\$45.00 60.00 108 gro

Caps—Percussion—

Eley's E. B.per M 32@5c

F. L.per M 37@5c

G. E.per M 47@5c

Musket.per M 57@5c

Cartridges—

Blank Cartridges:
 20 C. F., \$5.50.....10¢
 20 C. F., \$7.00.....10¢
 22 cal. Rim, \$1.50.....10¢
 22 cal. Rim, \$2.50.....10¢
 22 cal. Rim, \$3.50.....10¢
 B. Caps, Con. Ball Sugg. \$1.50@1.85
 B. Caps, Round Ball.....\$1.10@1.15
 Central Fire.....25¢@2.5¢
 Pistol and Rifle.....15¢@1.25¢
 Primed Shells and Bullets.....15¢@1.5¢
 Rim Fire Sporting.....50¢@50¢
 Rim Fire, Military.....15¢@1.25¢

Casters—

Bed.....70¢@10¢
 Plate.....75¢@10¢
 Philadelphia.....75¢@10¢
 Boss.....70¢@10¢
 Boss Anti-Friction.....70¢@10¢
 Martin's Patent (Phoenix).....45¢
 Payson's Anti-Friction.....70¢@10¢
 Standard Ball Bearing.....45¢
 Tucker's Patent, low list.....80¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Coil—

American Coil, Cask lots:
 3-16 1/4 5-16 3/4 7-16 1/4 9-16
 8.00 6.00 5.00 4.25 4.10 4.00 4.15
 4¢ 3¢ to 1 in. 3¢ to 1 1/4 in.
 8.85 8.80 3.75 per 100 lb.
 Less than Cash lots add 25¢.

German Coil, list July 24, '97, 60¢@10¢

Halters and Ties—

Halter Chains.....50¢@10¢
 German Halter Chain, list July 24,
 '97.....60¢@10¢ 1/2

Cow Ties.....10¢

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
 6 1/2-8 3/4, Straight, with ring.....\$30.00
 6 1/2-8 2/3, Straight, with ring.....\$1.00
 6 1/2-8 2/3, Straight, with ring.....\$35.00
 6 1/2-10 2/3, Straight, with ring.....\$38.00
 Add 2¢ per pair for Hooks.

Twist Trace 2¢ per pair higher than
 Straight Link.

Trace, Wagon and Fancy Chains.....50¢@10¢@50¢@10¢

Miscellaneous—

Jack Chain, list July 10, '93:
 Iron.....60¢@60¢@10¢
 Brass.....60¢@60¢@10¢

Safety Chain.....70¢@70¢@10¢

Gal. Pump Chain.....lb. 4 1/4¢

Coverd Mfg. Co.:
 Breast.....35¢@25¢

Halter.....35¢@25¢

Heel.....35¢@25¢

Hein.....35¢@25¢

Stallion.....35¢@25¢

Coverd Sad. Works:
 Breast.....70¢

Halter.....70¢

Fold Back.....70¢

Rein.....70¢

Neida Company:
 Am. Coll and Halters.....40¢@45¢@5¢

Am. Cow Ties.....45¢@50¢

Eureka Coll and Halter.....5¢@50¢@5¢

Niagara Coll and Halter.....45¢@50¢@5¢

Niagara Cow Ties.....48¢@50¢@50¢@5¢

Wire Dog Chains.....45¢@50¢@5¢

Wire Goods Co.:
 Dog Chain.....60¢@10¢

Universal Dbl-Jointed Chain.....50¢

Chalk Lines—See Lines.

Chocks, Door—

Bardisley's.....40¢@10¢

Columbia.....50¢@10¢

Eclipse.....60¢@60¢@10¢

Chests, Tool—

American Tool Chest Co.:
 Boys' Chests, with Tools.....50¢

Youths' Chests, with Tools.....40¢

Gentlemen's Chests, with Tools.....30¢

Farmers', Carpenters', etc., Chests,
 with Tools.....30¢

Machinists' and Pipe Fitters' Chests,
 Empty.....50¢

C. E. Jennings & Co.'s Machinists' Tool
 Chests.....30¢

Chisels—

Socket Framing and Firmer

Standard List.....70¢@70¢@10¢

Buck Bros.....30¢

Charles Buck.....30¢

C. E. Jennings & Co. Socket Firmer
 No. 10.....60¢@10¢

C. E. Jennings & Co. Socket Framing
 No. 15.....80¢@10¢

Swan's.....70¢@5¢

L. & J. White.....80¢@30¢@5¢

Tanged—

Tanged Firmers.....40¢@40¢@10¢

Buck Bros.....30¢

Charles Buck.....30¢

Cold Chisels, ordinary.....10¢@15¢

Chucks—

Beach Pat, each \$8.00.....20¢

Miss E. Player and Milling.....15¢@25¢

Skinner Patent Chucks: Combination Lathe Chucks.....40¢

Drill Chucks, Patent and Standard.....30¢

Drill Chucks, New Model.....25¢

Independent Lathe Chucks.....40¢

Improved Planer Chucks.....25¢

Universal Lathe Chucks.....40¢

Face Plate Jaws.....40¢

Standard Tool Co.: Improved Drill Chuck.....45¢

Talon Mfg. Co.: Combination.....40¢

Czar Drill.....30¢

Geard Scroll.....30¢

Independent.....40¢

Union Drill.....40¢

Universal.....40¢

Face Plate Jaws.....35¢

Clamps—

Adjustable, Hammers.....20¢@20¢@5¢
 Cabinet, Sergeant's.....5¢@10¢
 Carriage Makers', P. S. & W. Co. 40¢@10¢
 Drayage Makers', Sergeant's.....50¢@10¢
 Easy, Parallel.....33¢@10¢

Linenman's, Utica Drop Forge & Tool
 Co. 40¢

Saw Clamps, see Vice, Saw Fliers.

Cleaners, Sidewalk—

Star Socket, All Steel.....\$2.00 per doz.
 Star Shank, All Steel.....\$2.75 per doz.
 W. & G. Shanks, All Steel, 7 1/4 in. \$2.00
 \$3.05; 8 in. \$3.10; 8 1/2 in. \$3.25.

Cleavers, Butchers'—

Foster Bros. 80¢@10¢@10¢

New Haven Edge Tool Co. 40¢

Fayette R. Plumb. 33¢@33¢@10¢@10¢

P. S. & W. 50¢@50¢@10¢@10¢

L. & J. White. 35¢@35¢@10¢@10¢

Clippers—

Chicago Flexible Shaft Company

Handy Toilet.....\$2.30 per doz.

Mascotte Toilet.....\$2.30 per doz.

Monitor Toilet.....\$2.30 per doz.

Stewart's Patent.....\$2.30 per doz.

Clips Axle—

Eagle and Superior 1/4 and 5/16
 inch.....70¢@10¢@10¢

Norway, 1/4 and 5/16 inch.....70¢@70¢@10¢

Cloth and Netting, Wire—

See Wire, &c.

Cocks, Brass—

Hardware list:

Compression and Plain Bibbs, 65¢@5¢

Globe, Kerosene, Racking, &c.

Cocks.....65¢@10¢@10¢

Coffee Mills—See Mills, Coffee.

Collars, Dog—

Brass, Pope & Stevens' list.....40¢

Embossed, 1/4 in. Pope & Stevens' list 30¢@10¢@10¢

Leather Pope & Stevens' list.....40¢

Compasses Dividers, &c.—

Ordinary Goods75¢@5¢@5¢

Bidens & Call Hdw. & Tool Co.:

Dividers.....65¢

Callipers, Call's Patent Inside.....55¢

Calipers, Double.....65¢

Calipers, Inside or Outside.....65¢

Calipers, Wing.....60¢

Compasses.....50¢

J. Stevens A. & T. Co. 25¢@10¢@10¢

Compressors Corn Shock—

J. R. Hughes' 5¢@10¢@10¢

Conductor Pipe, Galva.—

L. C. L. to Dealers:

Territory. Not nested.....Nested.

Eastern.....70¢@4¢

Central.....65¢@10¢

Southern.....65¢

S. Western.....60¢@12¢@12¢

Terms, 25¢ for cash.

Jobbers receive extra 12 1/2% on car-
 loads loose, and extra 12 1/2% on car-
 loads crated.

See also Eave Troughs.

Coolers, Water—

Nos. 2, 3, 4, 6

Labrador \$11.50 \$14.00 \$17.50 \$20.00

\$8 gal.

\$3.00

Iceland, \$23.00 \$25.00 \$30.00 \$37.50

10 gal.

\$37.00 \$37.00

Coopers' Tools—

See Tools, Coopers'.

Cord—Sash—

Braided, Drab.....lb. 25¢

Braided, White, Common, lb. 17¢@18¢

Cable Laid Italian, lb. 18¢@18¢

Common India, lb. 9 @ 9¢@4¢

Cotton Sash Cord, Twisted.....lb. 12¢@16¢

Patent Russia, lb. 12¢@16¢

Cable Laid Russia, lb. 12¢@16¢

Cable Laid Russia, lb. 12¢@16¢

India Hemp, Braided, lb. 14¢@16¢

India Hemp, Twisted.....lb. 10¢@12¢

Pearl Braided, cotton.....lb. 10¢@18¢

Pearl Braided, White.....lb. 12¢@18¢

Massachusetts White, lb. 12¢@22¢

Massachusetts Dab, lb. 12¢@26¢

Eddystone Braided, cotton, lb. 14¢@16¢

Harmony Cable Laid Italian, lb. 18¢@18¢

Crown, Solid Braided White, lb. 12¢@22¢

Braided, Giant, White, lb. 20¢@20¢

Feeding, lb. 25¢@25¢

Cable Laid Italian, lb. 18¢@18¢

Cable Laid India, lb. 18¢@18¢

Braided India, lb. 18¢@18¢

Phoenix, White, lb. 18¢@18¢

Sanson, Nos. 7 to 12½

Braided, Drab Cotton, lb. 9¢@12¢

Braided, Italian Hemp, lb. 9¢@12¢

Braided, Linen, lb. 9¢@49¢

Braided, White Cotton, Spot, lb. 9¢@28¢

No. 6, 8¢@1¢ extra.

Silver Lake:

A quality, Drab, 40¢

A quality, White, 35¢

B quality, Drab, 35¢

B quality, White, 30¢

Universal Hemp, 40¢

Linen, 5¢@5¢

Wire, Picture—

Braided or Twisted.....85¢@10¢

Note.—There is a good deal of confusion
 in lists, some using old list and others the
 new list.

Cold—

Cold Chisels, good quality, lb. 13@15¢

Sold Chisels, fair quality, lb. 11@12¢

Cold Chisels, ordinary.....10¢@12¢

Chucks—

See Knives, Corn.

Corn Planters—

See Planters, Corn.

Crackers, Nut—

Little Giant, lb. 10, \$1.00, \$24.00

Cradles—

Grain.....\$1.00

Crayons—

White Round Crayons, gross, 5 1/2@6¢

Cases, 100 gro., \$4.50, at factory.

D. M. Steward Mfg. Co.

Metal Workers' Crayons, gr. \$2.50

Sapstone Pencils, round, flat
 or square.....gr. \$1.50

Rolling Mill Crayons.....gr. \$2.50

Railroad Crayons (composition)
 station, gr. \$2.00

Case lot, 20¢@10¢

See also Chalk.

Creamery Pails—See Pails, Creamery.

Crooks, Shepherds'—

Fort Madison, Heavy.....\$7.00

Fort Madison, Light.....\$6.50

Crow Bars—See Bars, Crow.